approach

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I don't remember the shock of the seat-firing.

3 WHO PULLED THE CURTAIN

Five A-4C completing simulated close air support strikes on targets designated in an exercise over Europe returned to the ship and proceeded to marshal. After the first aircraft got aboard, weather deteriorated to below 200 and $\frac{1}{2}$-mile minimums. The decision was made to divert the other four. At the divert field, language problems were encountered. Bad weather continued to complicate the situation.

Two of the aircraft made two passes over the divert field. Unable to locate it due to the weather, they cleaned up, climbed and became separated. One pilot, reaching a fuel state of 300 lbs., decided to eject. The second made one more unsuccessful attempt to locate the field, climbed out and ejected in a westerly heading toward the sea.

A third pilot, unable to locate the field, upon reaching 300 lbs. of fuel ejected over the sea. The fourth, aided by a transmission from the divert field tower, landed.

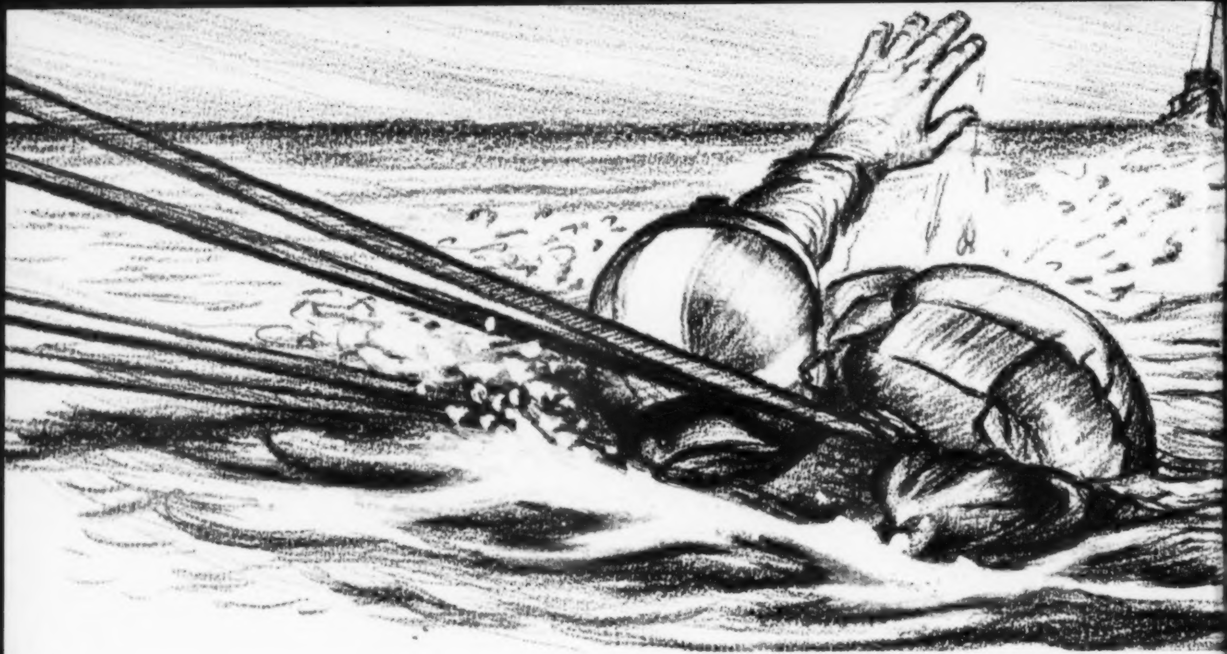
In accordance with APPROACH's theory that nobody can tell the tale better than the pilot who experienced it, here are the ejection and survival narratives of the three who pulled the curtain. . . .

Having previously positioned myself in the seat, I now lowered my visor, placed my helmet bag and borrowed Enroute Supplement in my anti-G suit pockets and thought about the ejection procedures. My position was 15 miles on the 120-degree radial at 17,000 ft. with about 100 lbs. of fuel. The aircraft was controllable, heading 180-degrees and I estimated I was within two miles of the beach so I could paddle ashore.

At a speed of 220 knots, I positioned myself in the seat and pulled the face curtain. I remember the canopy leaving the aircraft but not the shock of the seat firing. My next recollection is encountering a very high wind and beginning to tumble (backwards, I believe). I saw the seat some distance away and realized that I had separated. I decided to pull the ripcord on entering the clouds at 6500 ft. if the chute had not opened by then.

I attempted to stabilize my fall with my arms and legs but only succeeded in inducing more violent motion. Finally tried arching my back, extending my legs and keeping my hands on my chest. This was successful for a short time only. I free fell for about 45 seconds. However, there was no real discomfort from the tumbling.

Opening shock of the parachute caught me head down, arms and legs akimbo, still trying to stabilize the tumbling. The jolt was severe and my APH-5 helmet was torn from my head. Had not tightened the chin strap. Only the mask and Hardman fittings were retaining the helmet. My face hurt and my nose was bleeding. It took me an instant to realize that I was not really injured. At this point I removed my mask from my helmet, noticed that the bailout oxygen was still flowing, and put the helmet on again. This time I fastened the chin strap and snapped the mask onto the torso harness. Removed my gloves, switched my class ring from little finger to ring finger to keep from losing it and removed the D-ring to save it. In doing this, I noted that in this situation it is most difficult to raise your head as the chute risers bind on the helmet. The D-ring was a good deal higher on the riser than I had expected—stowed both D-ring and gloves under my



Upon landing, the parachute dragged me on my back. . . .

anti-G suit as I entered the clouds. Believe the chute opened very close to 10,000 ft. All systems were operating perfectly.

With no relative motion, my sensation in the clouds was one of hanging suspended and motionless. It felt as if the descent would go on forever until I entered the turbulent lower section. At this point the chute began to oscillate violently but I didn't seem to care at the time. However, I forced myself to pull on the risers and dampen the oscillations. The best results were achieved with the rear risers. As I continued to fall, the sound of traffic below drifted up and I realized to my surprise that I was over land instead of water. Thought about rolling and not tensing my legs and then broke out of the overcast at 200 ft. I was descending into a forest—figured I would break a leg at best. Pulled down my visor, but couldn't see (it was the dark one) so pushed it up again. Crossed my legs. As my feet contacted the ground, the chute caught in the top of a large pine tree and left me standing there. Unhooked the rocket jet fasteners and sat down to remove the seat pack. Looked around and, judging by the glimpse of the land I had had before hitting the trees, decided to walk south. Picked up the seat pack and, using the lap belt fastenings of the pack and the shoulder fastenings of the torso harness, carried it like a knapsack. A short distance away, encountered a couple who spoke limited English. They drove me to the nearest village. . . .

Now for the second pilot's account . . .

At 100 lbs. of fuel I commenced a climb heading out to sea. Broke out of the clouds at 6500 and told radar I was going to eject six miles south but, no answer. The engine RPM dropped twice at 7500 ft. and I pulled the emergency generator and again called radar and told them I was going to bail out. When the engine quit I took my knee board off and put my visor down. After trimming the nose up with the emergency trim, I pulled the normal ejection handle and the seat worked as advertised.

On the way down I took off my oxygen mask, took out my raft and inflated it and attached it to my torso harness. Broke out of the clouds at about 200 ft. and saw the water. Upon landing, the parachute dragged me on my back but releasing the chute was no problem. Climbing into the raft, I pulled in the seat pack. A fishing boat ½ mile away was heading toward me. I fired three shots from my pistol. . . . The men on the boat helped me aboard and took me to shore. I then took a taxi to the divert field. . . .

And here's the third pilot's story . . .

As I flew level at 10,000 ft. while preparing to eject, I went over the ejection sequence several times including alternate methods of releasing the canopy,

. . . I pulled my anti-G suit hose and tucked it down the left side of the suit. Pushed my gloves alongside the hose. Put my kneeboard on the right console. Stuffed my baseball hat down my right leg, lowered the seat slightly, tightened my oxygen mask, lowered my helmet visor and went to 100 percent oxygen.

The engine quit at about 14,000 ft. . . . My position was erect in the cockpit, both feet on the rudder pedals. I pulled the face curtain with both hands at about 12,500 ft. Time was 1704.

Heard the unreeling of the cable/pulley mechanism and then the rocket fired. Felt the wind and a sensation of rotation in a single vertical plane. Released the face curtain and with my right hand pulled the D-ring. The chute opened immediately. There was no jolt anywhere in the ejection sequence. Stuffed the D-ring and associated cable and pins into my anti-G suit.

In a minute or so I entered the overcast. My bailout oxygen ran out about halfway down—I removed the mask and threw it away. Rechecked all rocket jet fittings while descending and unfastened the left lower fitting so the raft pack would swing down and around. Pulled the raft out of the seat pack, looked it over and secured the lanyard to the left shoulder fitting. Raised my helmet visor. . . .

At about 200 ft. I broke out of the overcast and pulled both toggles on my Mk-3C. It inflated. I hit the water face forward at 12 to 15 knots. Impact was harder than I had expected. Releasing the shoulder fittings one at a time was no trouble. The parachute remained in the area for a short time, then sank.

Before inflating the raft, saw that my one-cell signal light was gone, apparently lost during ejection. The metal pin was still attached to my torso harness but the plastic light had separated.

Spreading the raft out, I inflated it and topped it off orally. After two or three attempts, I was in the raft along with 6 inches of water. Had to deflate the Mk-3C somewhat to fit in the raft comfortably (and I use the word in the very loosest sense).

After about 30 minutes I had sponged most of the water out of the raft and was beginning to organize my belongings when I thought I heard an airplane. Took off my helmet and turned to see an E-1B at my 3 o'clock , 1½ to 2 miles away, at about 2000 ft. Lit off a daysmoke signal which the E-1B could have seen if the pilot had been looking at his 8 o'clock position. Got to my PRC 32 as quickly as I could and gave a few calls. I could hear my signal and some scratching noise but had no idea how it was transmitting. Although the PRC-32 had been packed in a plastic bag, it had taken a lot of water. For this reason, decided not to use it again unless could see or hear an airplane. In an hour it would be dark and, with the weather as it was, I really didn't expect to

There were heavy rain showers,
the raft overturned several times

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see any rescue vehicles until morning. Discovered a small hole in the bottom of the raft. Untied half of the SEEK kit to get some bandaids. The bandaids stopped the leak for a short time only.

It was almost dark. I had snapped the poncho all around me when the raft was overturned by a large wave. Got back into the raft with only a little difficulty but found that the SEEK, one flare and the after portion of the poncho had been lost. Was thrown out of the raft several times during the night. Didn't get sick from the tossing sea but did throw up the salt water swallowed each time I was thrown out of the raft.

At about 2200 saw a ship which appeared to be moving in my direction. Fired a flare to attract attention. Used my last flare when the ship was less than a mile away. By now could see it was a merchant vessel of some kind. It stopped about a half-mile from me. The current prevented me from making my way to the ship. My flares were gone, my light had been lost and I did not have my .38 revolver. My only means of signaling was my whistle.

For two hours I drifted in an area $\frac{1}{2}$ to 1 mile of the ship, blowing my whistle every few seconds. Believe the ship lowered two boats although I never actually saw them being lowered. At times could see that I was almost surrounded by at least six white lights. Some of them blinked and two had a sweeping-like search movement. Began to wonder if the sweeping lights were buoys or lighthouses—the sweeps seemed too swift and rhythmic for searchlights.

The current now carried me toward one of the blinking lights. I paddled toward it—it was a buoy. The current carried me past the buoy although I tried to steer to it. By this time I was two or more miles from the ship and drifting southeastward. I never saw the merchant ship again.

Now I realized that in one direction the horizon seemed to be lighted as if from a town. There was a strong wind to my back as I steered toward the lighted area. It was about midnight.

Paddling enough to keep headed toward the lights for three hours, I estimated I closed 3 to 5 miles toward the shore. As I rose on the higher swells I could see that it was, in fact, a town I was heading toward.

At 0300 the current seemed to change and I was no longer closing on the beach. Wanted to keep steering toward the lights but was unable to stay awake. Was able to doze off for only a moment at a time because the raft would turn sideways to the swells and large amounts of water would come up over it. The raft overturned several times. There were heavy rain showers throughout the night.

By daybreak, I had drifted to a position west of a large lighthouse which had been south of me during the night. I checked my directions by three compasses—one, the type attached to the Mk-3C along with the whistle, the second the same as the first, carried in my anti-G suit pocket, and the third, the small wrist compass which comes in the SEEK kit. The latter had been on my wrist for about 14 hours and it no longer worked because it was watersoaked. (This compass is now dried out and functions properly.) The other two compasses, tied high on my shoulders, were somewhat protected from water; although some water leaked in, they still worked normally.

I opened the candy and chewing gum can and ate six pieces of candy. I chewed a piece of gum for about an hour.

There were a number of potential rescuers in the area—several planes and a large fishing boat about a mile away. A P-2 flew past north-to-south about 0645. I called on the PRC-32 but there was no response. I tried to get into position to signal the fishing boat with my mirror but the sea was such that I only caught glimpses of him. I used the whistle until he was out of sight.

An E-1B and an EA-1F were running a search from east to west. Twice they passed within a couple of miles of me. Each time I used the PRC-32 voice mode and the 243.0 mc tone. I tried using the signal mirror although it had been broken, most likely during the ejection.

At 0730 or so an E-1B came within a mile or less and made a series of turns. I called to him on the PRC-32, "Look at your 9 o'clock" and finally he saw me. He flew directly over me at 50 ft, rocking his wings. Within minutes, two more E-1B's and two EA-1F's arrived. Nearly two hours elapsed before the rescue destroyer was on the scene. During this time two merchant vessels passed within a mile of me. The aircraft overhead tried as best they could to have these ships turn to pick me up but the ships did not alter course. At this time I was in a heavy rain shower.

At 0900 I could see the destroyer on the horizon. As it approached within 100 yards, I unsnapped the poncho and freed the raft lanyard from my shoulder. A man in a wet suit was lowered to steady the raft and assist me in getting into the sling. I was hoisted aboard at about 0925, given dry clothes, hot soup, hot chocolate, toast and the Captain's in-port stateroom. . . . I had been in the water some 16 hours.

Outfitting the SURVIVAL VEST

There are apparently as many ways to hang survival gear on the standard Navy SV-1 vest as there are users in the fleet. Here are selected minor modifications found desirable by six commands, together with some comments by Riggermouse.

VMFA-314's survival vest is made of 8-ounce nylon duck with slide fasteners across the top and front of each pocket for easy access to the equipment inside. There are also pockets on the front for pencil flares and a shroud cutter as well as an attaching strap for the signal light.

The vest is attached to the torso harness by lacing the Mk-3C attaching straps through slits at the lower edge of the vest, attaching a strip of webbing to the back of the torso harness and lacing the vest to the no. 6 webbing with type 3 shroudline and by tacking with cord to the material at the shoulder straps. This keeps the vest in position during ejection. Fully equipped, the vest weighs between 6 and 8 pounds depending on equipment the individual wishes to carry. A list of basic items carried in this vest and photographs of the vest appeared in the June 1964 F-4 "Crossfeed."

This modified SV-1 survival vest was developed by VA-125. The vest is not permanently fixed to the torso harness. It uses the Mk-3C retainer straps which keeps the vest from rising up and obstructing the rocket jet fittings. Placement of the survival knife and shroud cutter gives maximum accessibility. The squadron reports that modification of the SV-1 vest requires two man-hours.

NAS New Orleans contributed two photos of a dummy (right) wearing their survival vest and torso harness. The shroud cutter knife is inserted in a pocket, blade open and protected with plastic "spaghetti," FSN R5970-235-2729-D336 (½ inch). This plastic covering is secured at the bottom of the pocket so that it remains when the shroud cutter is removed. The knife is secured against loss by accordian-folded nylon line. It is carried in the personal equipment pocket along with the PSK-2. Both shroud cutter pocket and survival knife pocket are fastened with velcro tape for easy access. The personal equipment pocket is part of the survival vest which is attached to both sides of the torso harness and is adjustable for fit by means of nylon strings in the back.

The photo of the left side of the dummy shows the Penguin flare launcher partially out of the pocket and the bandolier exposed

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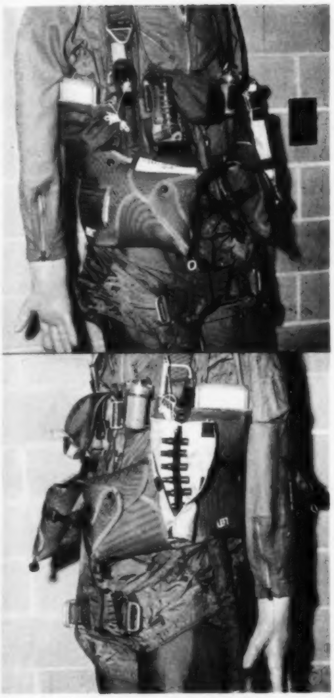
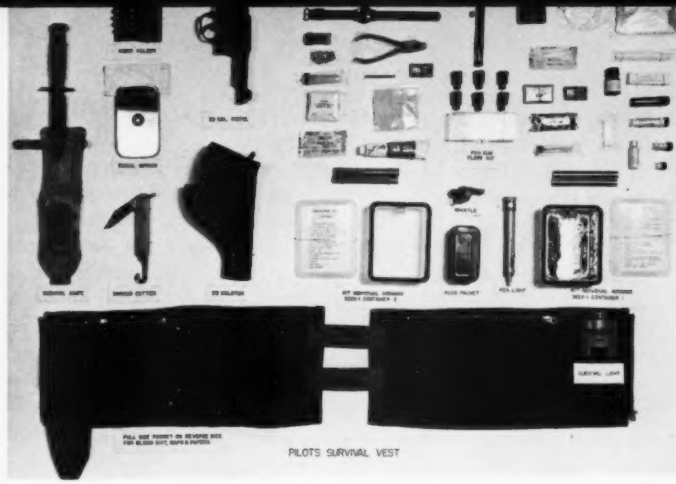


NAS New Orleans contribution

for illustration purposes. The bandolier is enclosed in asbestos and is normally carried in the left vest personal equipment pocket with the second part of the PSK-2. All equipment is secured with accordian-folded nylon line. As needed, the flares can be screwed in the launcher with one hand while they are still in the bandolier and then can be pulled out.



A modified survival vest made up by MAG-52 contains these assorted items. Further modifications are planned.

VA-192's survival vest was developed by PRC W. T. Meadows. The two front edges of the vest are sewn to the torso harness at the seam inboard of the straps that connect to the parachute riser straps. This is the only attachment to the torso harness. The back is adjustable.

The large zippered pocket on each side of the vest contains three pockets for Parts I and II of the PSK-2 kit and a signal mirror plus any other items the wearer chooses to carry. Attachment of signal lights to the vest is left up to the pilot preference.

VA-192

VMT-1's primary concern in designing a survival vest was accessibility of survival gear to an injured pilot. Extra steps were taken to facilitate opening the vest's pockets and removing the shroud cutter with wet gloves or an injured hand. The shroud cutter is on the upper front right of the torso harness, high enough to ride above an inflated Mk-3C. The pocket is pulled open by a length of webbing with a knobbed end or a loop. When the pocket is opened, a rubber band, which also holds two feet of no. 1 shroudline in, throws the line out and over the top of the inflated life preserver.

The cutter has a length of webbing attached to its upper ring. The pilot can extract the cutter from the pocket either by pulling on the knobbed end of the webbing or by pulling in the shroudline. The line keeps the shroud cutter attached to him, should he have to use it again. After a simple demonstration of the effectiveness of this arrangement, the squadron reports, not a soul has walked away without one on his torso harness. The survival vest has other innovations which the squadron recommends enthusiastically.

VMT-1

FLAILEX

TRUTH and CONSEQUENCES

FLAILEX is a term describing "one of those flights" on "one of those days" when nothing seems to work out quite as planned. Errors are numerous and although, on the whole individually not catastrophic, they are cumulative. FlailEx is one of the top producers of grey hair, ulcers, Anymouse reports and sea stories. FlailExs have, on occasion, been known to terminate in an accident. Such is the following FlailEx.

Hoss thought it was just too pretty a day for anything to go wrong. There he was, leading the flight of three A-4Bs at FL 330 heading for home bringing to a conclusion a transcontinental "round robin"

navigation hop. An instrument approach would be made at homeplate; however, the forecast weather on the flight plan was 500 scattered, 3000 scattered, occasional 1500 broken with 3 miles visibility and fog. This was well above the 200-foot and half-mile GCA minimums.

Immediately after a position report, Sparrow, the left wingman, advised Hoss that he had a radio malfunction. His radio worked fine on preset channels; however on manual he could only hear transmissions from within the flight. Since Sparrow was obviously missing all ground transmissions, Hoss decided to repeat all ATC orders of significance and to keep him on his wing during the instrument penetration. No sweat—Hoss thought, as he turned his attention back to his navigation.

About five minutes later, Doc, the other wingman, advised Hoss that he was experiencing RMI difficulties. Again Hoss "Rogered" and decided that Doc had also better stay on his wing during the instrument penetration.

At about 60 miles from home plate the flight entered the clouds. A minute later they were given a descent to FL 310 and told to change frequencies. Hoss commenced the descent immediately; out of consideration for the wingmen, he temporarily refused the frequency change since the flight was ex-

periencing considerable turbulence in the clouds and would have made a hazardous situation of flying wing and dialing in a manual frequency.

During the descent, Sparrow took it upon himself to switch to Metro on a preset channel and obtain the latest home plate weather from a nearby Air Force Base. While Sparrow was talking to Metro, Hoss leveled the flight off at FL 310 and since the turbulence had now subsided, accepted the previously requested Center frequency shift. On the new Center frequency, the flight was given further clearance to the home plate tacan holding fix and to descend to 20,000 feet. During the descent, Hoss obtained a quick weather report from home plate tower. It was about this time that Sparrow returned to the old Center frequency. Since he hadn't been reading any of the ground stations that were cranked in on manual, he was extremely slow to recognize that the rest of the flight had switched to a new Center frequency. By the time he realized this, the flight had descended to 20,000 feet, entered the holding pattern and had switched to Approach Control frequency.

The situation at the start of the tacan approach was solid instrument weather at altitude; field weather reported as 2500 scattered, 4500 scattered, 1½ visibility with rain; Sparrow was flying Hoss's left wing position and Doc on the other; Sparrow was still on the old Center frequency wondering why he hadn't heard anything from the lead. Sparrow had realized that the flight had entered holding and, being familiar with the home plate holding pattern, had reset his altimeter to 20,000 feet at that time *(Producing a 29.92 setting vice home plate's actual setting of 29.50—Ed.)* Since Hoss had repeated every frequency shift after it was received, he assumed that Sparrow had heard and had shifted frequencies with the rest of the flight and knew what was going on even though he might not be reading the ground transmissions.

The flight was switched to GCA frequency almost immediately after commencing the tacan approach. When interrogated as to his intentions, Hoss stated that the left wingman would land on the GCA and the other two would circle for a landing. GCA "Rogered" and continued giving directions.

In the meantime, Sparrow continued to fly left wing and was frantically trying to find the frequency that the rest of the flight was on. He finally stayed on tower where he heard the tower advise a *Beechcraft* that they couldn't clear him for takeoff as three jets were making an instrument approach. Since this sounded like VFR language, he was falsely reassured that the weather was as previously advertised.

The tacan approach was normal in all respects except they found it solid instruments all the way down. GCA picked them up and the trio started on GCA glide path, each fully expecting to break out VFR well above GCA minimums.

About a mile out the high intensity approach lights for the runway were finally sighted and the green threshold lights at about one-half mile from the end of the runway. Due to the uncertainty of the situation and the totally unexpected existing weather, Sparrow elected to remain under lead's nice comfortable left wing and waved off with the rest of the flight. Since the weather was below VFR circling minimum, Hoss requested positive radar control all the way around for another GCA. He now assumed that Sparrow had complete radio failure. During the downwind GCA leg, Sparrow finally tuned in the GCA frequency *after* Hoss had told GCA that the right wingman would land this pass and the other two would wave off again. On the crossleg, GCA passed a special weather sequence report of 400 ft over and ¾ of a mile in rain and fog. This was acknowledged by Hoss with a sarcastic "Roger."

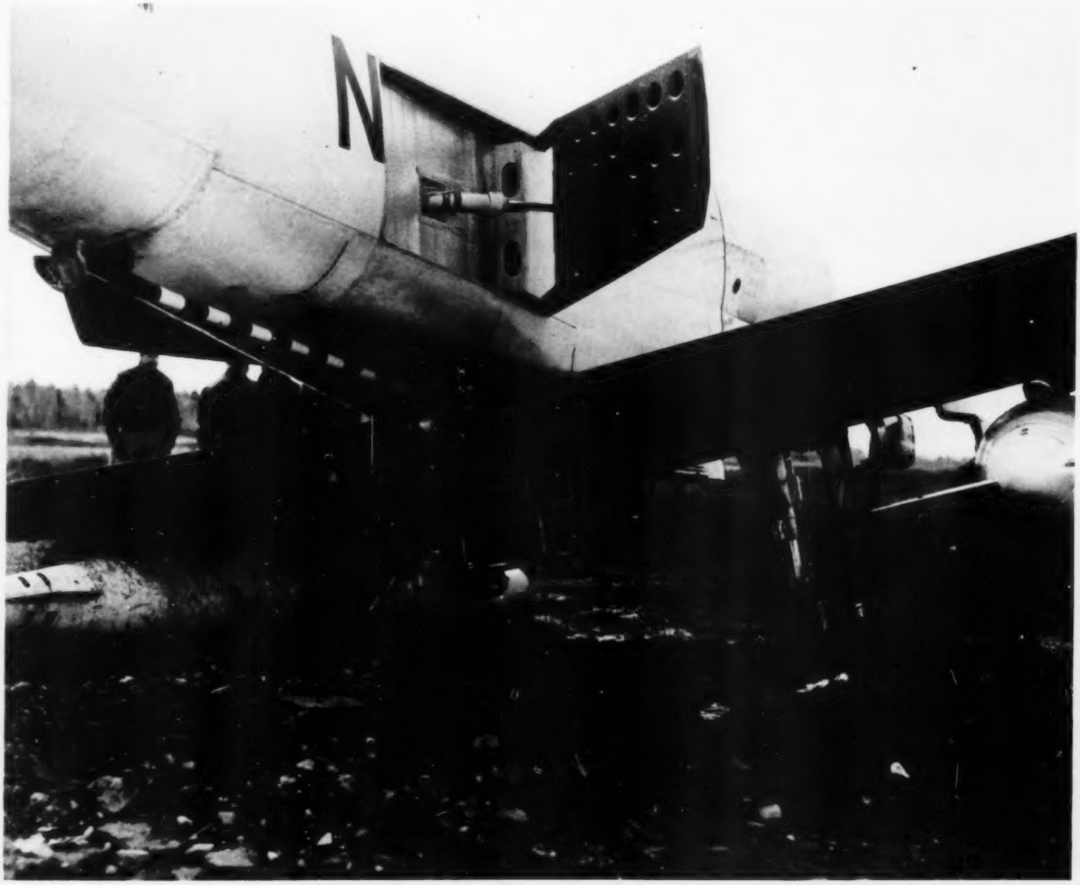
As the trio again approached glide path, Sparrow was still uncertain as to what was going to happen. However, he'd had enough IFR for one day and had decided he was going to land regardless of what the other two were going to do this pass.

Weather conditions appeared to have degraded even more. The high intensity approach lights were sighted just before they started passing over them and the green threshold lights didn't come into view until within about 2000 feet of them.

As the approach lights were sighted, both wingmen immediately started to maneuver in preparation for the landing. Both realized each other's landing intentions simultaneously and took steps to share the runway with each other. Doc moved to the right a bit to give Sparrow his share on the left side. Sparrow hacked the power to insure that Doc would land ahead of him and in the process, got a whale of a sink rate started. Doc touched down about 500 feet down the runway well on the right side. Sparrow's touchdown was a bit more dramatic—real technicolor! Acutely aware of his sink rate, he touched down with his "Foot in the Bendix" trying to get enough power on to arrest the descent. After planting the port main gear three feet short of the runway, the gear collapsed as a combined result

of a hard landing and impact against a 4-inch runway lip. The A-4 continued up the runway on the port wing tank and other two wheels approximately 2000 feet before it gently turned left and skidded onto the grass. As a final act of defiance to the world, the *Skyhawk* demolished the 4000 ft runway marker as it left the runway. The aircraft came to rest about 140 ft within the "infield" with the altimeter still indicating 420 ft of altitude remaining (the 20,000-ft rattlesnake that didn't strike in this accident).

Good old Hoss finally got his turn. He landed without incident after another real live GCA at bare minimums.



Final resting place inside the "infield."

The P-3A has been with us for some years now. Yet many pilots with considerable time in the machine still look surprised when I state my preference for a jet penetration to an enroute letdown and *standard instrument approach*.

It seems a simple elementary deduction to me that the penetration is by far the simplest, safest and most efficient way to get a high-performance aircraft (jet, turboprop or conventionally powered) from 20,000 feet or more to the chocks. Personally I only consider an enroute letdown and standard approach when it does not require a procedure turn of some sort. Even then, prior to leaving the efficiency of altitude operation I require accurate information as to weather, traffic delays and expected approach time.

Maintaining at least 20,000 feet until over the facility is almost as cheap as the enroute letdown due to the higher true airspeed at altitude and the higher power settings required on GCA or approaches at low altitude. Waiting until it is absolutely necessary to depart your altitude is like money in the bank should another aircraft declare an emergency, land gear-up and close the field or should weather force you to the alternate.

The P-3A can and should be operated in the realm of the Jet Jockey. To exploit it to its full capability requires a complete knowledge of the machine, as well as of its equipment and tactics.

Computation of a realistic prudent limit of endurance time is somewhat dependent on your destination letdown. The following will amplify the 66 words on penetrations on page 6-3 of the P-3A NATOPS. The extremely limited attention given to penetration in the NATOPS is an indication of the simplicity of the maneuver. Lack of a thorough knowledge of the details and/or proper preparation can result in a complete penetration and landing which provides a pilot with little satisfactory appreciation of the procedure. He might then decide not to attempt the maneuver again and fail to reap the profits to be gained.

Try it this way at least one time before you judge the maneuver. Let's take it from 20,000 feet step by step for drill:

Three Minutes From Station—Descent Checklist—flaps to MANEUVER (not above 275 IAS), start slowing to 190 knots.

Over Station—Landing Checklist—190 knots, flaps to APPROACH, gear down (a proposal for a full-flap, gear-down penetration at 165 knots has

been submitted for NATOPS approval, to be used with close-in penetration turns. Though flap and landing gear icing must always be a consideration in any approach, jet penetrations do not seem to be as susceptible to icing due to the rapid transit through the icing area). Do not leave altitude if you have more than 60 degrees to turn to out-bound penetration course. A lot of altitude can be lost in an excessive turn and the aircraft will not then be far enough out for the penetration turn. You must know the distance limit of the penetration turn, and without DME, you must time out so as not to exceed this distance. Set up the Bearing Distance Heading Indicator and flight station plotter as back ups. At 190 knots IAS your TAS will average about 240 knots down to 12,000 feet. This means that in no-wind air, at 2000 feet per minute down, with 16 miles to turn and a $1\frac{1}{2}$-mile turn radius, you are $17\frac{1}{2}$-miles out $4\frac{1}{2}$ minutes after leaving the station. Don't let the IAS bleed off, if it does your penetration turn will be farther out—due to the greater effect of reducing the rate of descent (penetration turn being executed at a designated altitude).

How important is this distance? Let's check some facts about penetration turns in continental United States. Percentage of turns within 20 miles or less run like this: 28 percent in the Southeast, 36 percent in the Southwest, 42 percent in the Northeast and over 90 percent in the Northwest. Don't just think

The Orion can and should be operated in the realm of the jets from start to finish.

in terms of terrain because other traffic areas can also affect penetration turn limits. A midair collision can ruin your whole day just as much as sudden mountain stoppage.

Penetration Turn—This is nice and easy, having no course reversal to invite vertigo! You couldn't stall in this attitude without conscious effort. Thirty degrees of bank is usually too much—with inbound course cranked into the Horizontal Situation Indicator system, all one needs to do is run a pursuit curve to the course by keeping the lubber line on the tip of the course bar until it holds steady. The drift correction solution falls out automatically.

Inbound—Never let your rate of descent exceed one-half the altitude; adjusting with altitude change and a decrease in IAS, until reaching 145 knots. About 1000 hp per engine will be required at almost the same time you reach your minimum altitude. You are now ready to land (with approach flaps at 1.35Vs). Execute missed approach or lower full flaps for a normal landing. Total time from 20,000 feet to landing runs about nine minutes with all but the last minute at flight idle fuel consumption. Remember to clear your ears about every 2000 feet because the sudden natural equalization of ear pressure can produce vertigo at the most critical time.

Everything said here is nothing but common sense, yet on the last 25 instrument checks I have given in the P-3A this was not known by the pilot being checked. In more than half the cases it was their first jet penetration.

Like any instrument approach, practice improves proficiency and proficiency leads to professionalism, which is the basis for us being in the machine.

This article was written by an experienced P-3A pilot and this is his preferred method of reaching the final approach course in a given set of circumstances. It is not to be construed as standard P-3A operating procedures to be employed in every situation.

All Pilots Read

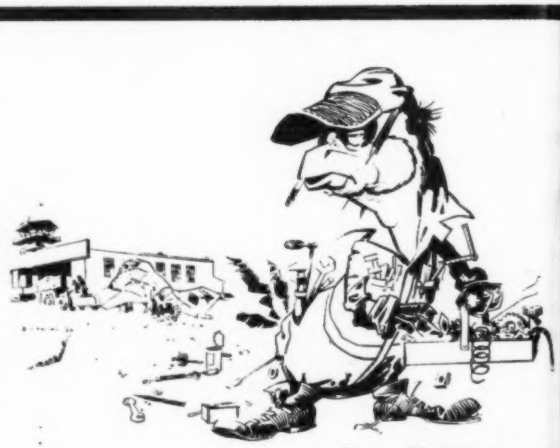
FOD Spreader

A close relative of the Migrating Nest Fouler but much more dangerous. In addition the smaller birds can create as great a hazard as the larger, all of which nest in areas adjacent to jet aircraft bases.

This species roams aimlessly about parking and taxi areas, spreading nuts, bolts, tools and other portable objects which will readily enter air intakes of jet engines resulting in various degrees of damage. The FOD spreader takes pride in its work and is especially efficient in spreading foreign objects in a newly swept area.

A careful watch must be kept for this species and if any are discovered, should be captured (alive if possible) and transported to a non-flying Arctic base.

Call: LOSTMEWRENCH, LOSTMEPLIERS, LOSTMEBOLT, LOSTMEHEAD!



Thanks to RCAF Flight Comment

LACKADAISICAL FOD SPREADER

SOUNDING BOARD

The sonic boom from jet planes breaking the sound barrier gets an enthusiastic response from the bull alligators in the Everglades swamps. Naturalists speculate that the boom from the plane is on the same frequency as the alligators' mating roar; the 'gators mistake the boom for a challenging male and boom back, causing others to get into the act, and so on until the swamp is in an uproar.

"By insistence upon a vigorous program of safety in design, we can not only reduce the number and severity of aircraft accidents, but we can improve cost effectiveness at the same time. Too often, safety deficiencies that should have been discovered and eliminated in the concept, design or test phases, have not been discovered until after the aircraft is operational."

— RADM E. C. Outlaw

Getaboarditis

Utilizing the lead article "GETABOARDITIS" in the January 1964 issue of APPROACH magazine as a guide, the recommendations of the aircraft accident board have become the subject of renewed emphasis during weekly Safety/NATOPS discussions in the squadron. This accident demonstrates the obvious though sometimes deemphasized point that "GETABOARDITIS" can result in prop aircraft accidents as well as jet aircraft accidents.—*From an AAR*

Red Hot Check List

One fire, and one near fire resulted on CV-880 aircraft when a check list was ignited by indicating lights on the Second Officer's panel. . . . *"Up Front" (Delta)*

Two-Fingered Pete

Many pilots enjoy working with wood and so have well-equipped workshops in their basements. This equipment often includes both band and circular saws that rotate at constant speed when in use. The stroboscopic effect of fluorescent lighting in a workshop may cause the saw to appear to be motionless . . . and then accidents happen.

The Dutch Government now requires ordinary incandescent filament bulbs in shops regulated by their Department of Labor; flourescent lights are prohibited.—*FSF Bulletin*

"Snakes in the Cockpit?"

Shortly before a weather penetration, an F-100 pilot experienced a hot cockpit condition. During the penetration, he felt what he thought was a grasshopper lodged in his helmet. While attempting to continue his instrument approach and to dislodge the unknown intruder, he saw a snake of unknown variety crawl across his legs and disappear from view under his right leg.

Somehow, through superior skill and cunning while dislodging an insect, cooling the cockpit, and expecting a snake bite at any moment, the pilot completed his approach and landing in an otherwise relatively normal manner.

The hot cockpit was caused by failure of the cooling turbine. The resultant heat evidently caused the unusual amount of movement by the uninvited guests in the cockpit. The snake was apparently transported to the aircraft in the pilot's helmet bag which had been left for several hours in the squadron area. Investigation also indicated that what the pilot thought to be the grasshopper in the ear phone area of his helmet could very well have been the snake whose length was estimated at approximately 15 inches.

Some people claim they have seen pink elephants climbing the bedroom walls, but—"Snakes in the Cockpit!"

—USAF ATC "Safety Bulletin"

Taxi - Maze

Upon completion of a 5-minute passenger stop the copilot of a C-1A requested taxi instruction from Ground Control.

A very light rain was falling, and visibility was poor on the blacktop ramp at night. The pilot taxied back toward the duty runway and saw blue taxiway lights on the parallel taxiway. He was following a yellow line and was using the ramp edge markers on his left. Upon losing sight of the edge markers and the yellow line, the pilot asked for additional taxi instructions.

"Taxi straight ahead on base ops apron to the blue lights, then it's a right turn," replied Ground Control.

The pilot continued taxiing straight ahead on the apron across 65 feet of grass area, and into a 7-foot deep drainage ditch.

"This accident," said the pilot, "could have been prevented had I elected to use the taxi light when I was first in doubt of my position or had a follow-me vehicle been utilized in directing me through the more poorly lighted area where the accident occurred."

.The layout of the taxiway was unusual, since it consisted of a wide apron which suddenly narrowed down to a short throat.

The taxiway had a painted yellow line leading directly toward the ditch. This line ended approximately 65 feet from the grass and tended to give the pilots the impression that they were in the center of the normal taxiway.

There were no warning signs, obstruction lights, or other signals to indicate that a hazardous condition existed near the taxiway.

Who's on First?

Anymouse Special

I was no. 2 man in a flight of four F-8Cs on a flight from NAS Dogpatch to MCAS Gyreneville. Executing a radar departure on takeoff we joined up under an 8000-foot ceiling and proceeded to VFR conditions on top at 41,000 feet.

The flight to MCAS Gyreneville was as planned. Upon reaching the destination we reported to the center and asked for individual tacan approaches and GCAs for four aircraft. The marshal pattern was crowded—six other F-8s and two other carrier group aircraft made a sum total of 12 jets in the pattern. There was two-mile visibility with light rain and fog, with cloud cover broken at 1700 feet, scattered at 2800 feet and overcast at 7000 feet.

The first flight of U-Birds penetrated from the south for a straight-in shot to runway 1 hoping for a VFR break and standard morest landings. As they closed in, Approach Control called and told them that the field was closed because a *Fury* was still in the chain gear. The F-8s scampered VFR back on top and got back into the holding pattern. Once in the holding pattern, they then split into two sections to make section tacan penetrations and GCAs—one bird to take the morest and the other to be vectored back around the pattern by GCA.

No. 1 man in the first section got aboard as his companion got vectored around by GCA and landed on his second try. The second section penetrated about 10 minutes later and broke out on GCA final with less than a half-mile visibility. The first man got aboard but no. 4 man got a waveoff and was vectored around the pattern by GCA.

Meanwhile, back at the marshal pattern: as no. 4 was making the GCA tour nos. 5 and 6 in the flight snuck down the glide slope to a successful section landing.

My leader commenced his approach as no. 4 was still making his GCA tour.

Upon leaving 20,000 feet on my penetration, five minutes after my section leader, I was told to stand by for a GCA frequency. I entered the clouds at 17,000 feet and at about 12,000 feet, 22 miles out, I was told to switch to GCA.

Getting on my GCA frequency I heard no. 4. I tried to establish contact with GCA four times and finally switched back to Approach Control. By this time I was at 5500 feet, 16 miles out on a tacan approach. Approach Control told me to climb to 7000 feet immediately and start a left turn. I asked Approach Control for a heading.

"Make a port 360° turn and then continue with your tacan approach," they told me.

I found out later that this turn was a delaying maneuver so that GCA could vector no. 4 around and squeeze him in between me and my leader.

Ol' leader ended up left of the centerline, executed a missed approach and returned to the 20,000-foot marshal pattern—out of the low altitude fracas.

Completing the 360° at 7000 feet, I called Approach Control and told them I was continuing my penetration. They asked me to report at the nine-mile gate. At the nine-mile gate I called again and told them my mileage and altitude. They acknowledged.

At this time ol' no. 4 man made his landing, missed the morest gear and had to take a waveoff. With only 500 pounds of fuel and the weather eliminating the low visibility approach, he was left with two choices—eject and lighten the aircraft or ask GCA for permission to make a quick 180° and land the other way. He whipped a tight 180°, touched down fast and long on the opposite end with his hook down.

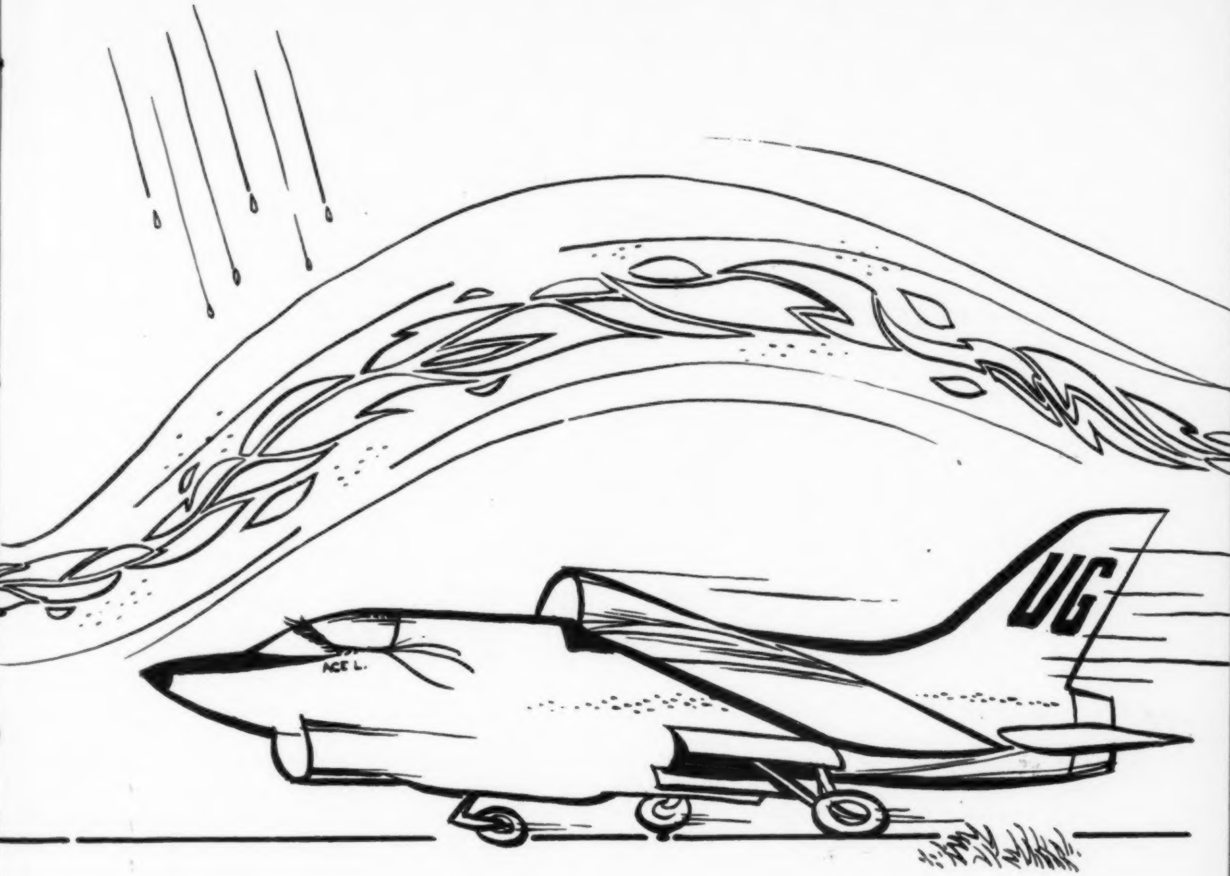
As our hero was making this touchdown, I was getting on with my tacan approach. At a half mile out, I sighted the approach lights. I was in the dirty configuration at 300 feet. I touched down 500 to 1000 feet from the beginning of the same runway, going in the opposite direction to no. 4 at about 150 knots.

Peering out the windscreen I saw another F-8 streaking toward me on my runway. Guess who?

Common sense taking precedence over courtesy, I poured it to the Pratt & Whitney, hauled back on the stick, banked right and struggled over our boy as he attempted to stop short of the end of the runway. I managed to get back on the runway in one piece and began correcting to engage the morest.

Well, I missed the cable and at the same time received a waveoff from Approach Control.

"Nothing like an early waveoff," I thought to my-



self. "This really makes my day complete."

Already slightly disgusted with operations at Gyreneville, my mood failed to improve when I noticed six or seven crash vehicles steaming down the runway at me. They were chasing my playmate who had by this time run off the other end of the runway into the water. Due to hook skip and low fuel state, he had cut the engine and attempted to brake the F-8 to a stop.

This is where I came in. I again added power, cracked in the burner and hauled the U-Bird off the deck, barely missing the trucks. One slightly shook crewmember reported the wing tip missed his truck by inches.

Climbing VFR to the top, I found my colleagues rendezvousing with two KC-130Fs, taking on fuel to return to NAS Dogpatch.

After leapfrogging all over the runway at Gyreneville, I had 1200 pounds and decided to also take a drink. The tanker could only spare 800 pounds. Slightly shaky from my game of bounce-and-go, it took me five attempts before I got plugged in. Taking on all the fuel the tanker had to spare, I had a grand total of 2000 pounds. This was a little light since it would take 2100 pounds to get back to home plate.

Cognizant of my predicament, another tanker called and said he could spare some fuel. This time I plugged in after only two attempts and added 1500 pounds to my tanks. I then turned toward home.

At 101 miles out Dogpatch Approach Control gave me a radar controlled enroute idle descent. I broke out at 16,000 feet. The landing was uneventful with the fuel low level warning light glowing during rollout—adequate punctuation to end a three-and-a-half-hour spectacular.

Flash Fire

I was lead plane in a section of *Skyrays* on an instrument hop. My wingman aborted and I asked the squadron if they intended to send up a replacement. They told me to make a weather check, burn some fuel and come home when my fuel weight was right.

I was at 8000 feet boring holes in the clouds and everything was going fine and dandy. Unhooking my oxygen mask, I settled back and lit up a cigaret. (A practice done by many, condemned by others, but never decreed concretely against).

I was halfway through the cigaret when the fuel weight looked suitable to go home. I snuffed the smoke out on my kneeboard and buckled the oxygen mask back on and turned on the flow. I noticed a burning smell and unhooked the mask to check the cockpit.

As I removed the mask, a stream of flame about 18 inches long burst forth.

Evidently, a hot ash from my cigaret had dropped into my mask and was still glowing when I replaced the mask and turned the oxygen flow on. On smelling smoke, I had removed the mask at the same time a full flow of oxygen whipped over the hot ash resulting in a flash fire in the cockpit.

I yanked off my helmet and turned off the oxygen flow. The flame went out. The entire inside of the mask was charred but that was the only damage; the mike was still working.

I returned to base with my head full of visions of what could have happened if I had been wearing the mask when the full flow hit the ash.

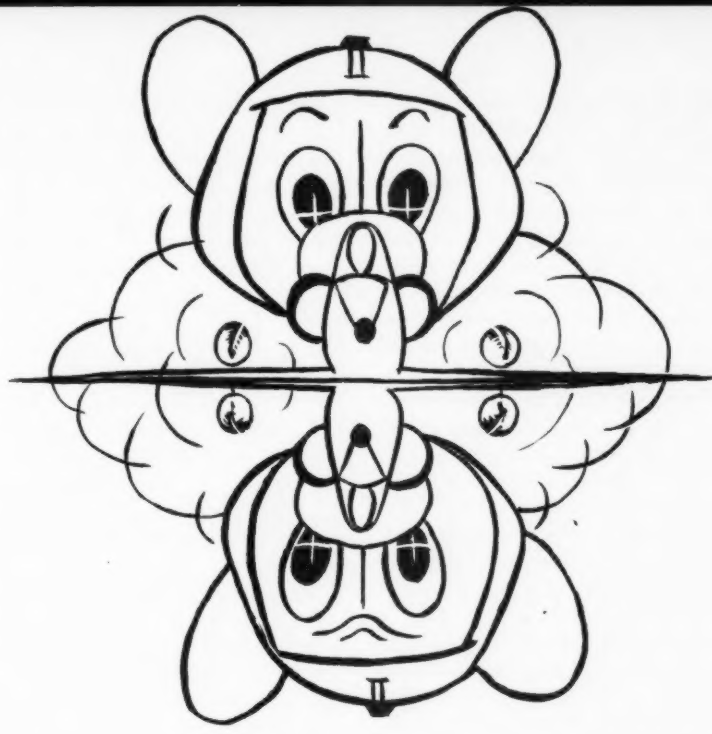
I spread the word and I think some of my colleagues took it to heart, but one thing is certain, I intend to leave the smokes on the deck from now on.

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

Vertigo



The buddy bombing launch went as planned at just a few minutes before sunset. I was the pilot of an A-4C and I rendezvoused with another A-4C and an A-3B. Our location was in the Pacific just south of the Hawaiian Island of Oahu. The weather was clear, a typical starry evening with no moon. Visibility at low altitude was somewhat restricted due to haze.

Our mission was a night conventional buddy bombing hop with level drops from an altitude of about 15,000 feet. We flew a navigational route to our target and held VFR over a land mass until cleared on target. Up until this point, the flight had been conducted under day or dusk conditions. Prior to our first run darkness had set in and it was quite black with numerous stars.

The first run went quite smooth, but after that I began to have a little difficulty flying a smooth wing position on the A-3B. The other A-4C had his lights on bright and flashing in accordance with Air Group Buddy Bombing Doctrine, and I noticed that the flashing lights were distracting me considerably. I tried to fly a position forward on the A-3B so that his fuselage would block out the other A-4C. This resulted in my having to fly with my head turned about 90 degrees. Towards the latter part of the bombing runs I was beginning to experience some vertigo, but it was momentary only.

Enroute back to the carrier, the A-3B developed hydraulic difficulties and elected to bingo to NAS Barber's Point. I then joined on my section leader and at this time I was suffering from severe vertigo, but felt that I could shake it now, as I wouldn't have to watch the flashing lights. We continued inbound to the carrier and I was still experiencing vertigo, but had now convinced myself that I could again shake it after we broke up at altitude for our Case II straight-in GCA. As luck would have it, the ship's tacan was inoperative and we were told to report over the ship and stand by for instructions.

At this point I was beginning to feel somewhat concerned and apprehensive about the remainder of the hop. I had not notified anyone at this point of my difficulty.

After making about three trips around the holding pattern we were then cleared to make a descent using a no-tacan modified UHF penetration. Due to the delay in our approach time, we were below our planned recovery state, and I knew that by the time I would be on final my state would be at or below bingo weight for Barber's Point. I feel this increased my anxiety a great deal and did not help psychologically to prepare for the task of recovering aboard.

We were not instructed to break up at any point during the approach, and I did not want to descend any lower before making the transition, so at 2000 feet I called CCA and my wingman and told them I was breaking away, and that I had a severe case of vertigo. This was the first time I had confessed my troubles to anyone.

While maintaining 2000 feet ($\pm$500), I tried flying the gages and soon settled down somewhat. I was eventually told to descend to 1000 feet, which I did gradually and was vectored to the final approach bearing. When about six miles astern I looked out to see if I could go VFR and soon saw that it was hopeless as *I still had the sensation that I was on*

my back and that the ship was above me! I immediately went back on the gages and told CCA I was going to bingo to Barber's Point and requested my vector to same. My state at this time was about 250 lbs below bingo which was figured for an 800 lb reserve. I was given a vector to the downwind position which I ignored and *emphatically* requested a steer to Barber's Point. During the preceding radio drill, I had been climbing out on the briefed heading to Barbers. I was once again given a vector to the downwind position and told to recover aboard. I informed them that I was definitely going to bingo and then was given my steer to Barbers.

I stayed on the gages until about 50 miles out from the Island of Oahu at an altitude of about 30,000 feet. I then peeked a look and could see the island clearly, but still could not "right myself." I had an acute sensation of the shoulder straps cutting into my shoulders as would be the case if I were hanging upside down. I now switched to Barber's Point tower frequency and informed them of my plight. At the suggestion of the tower operator, I was told that GCA would come up tower frequency and control my approach. They gave me an excellent approach and I flew the gages to touchdown with an occasional glance *up* to check my line-up. I had difficulty maintaining my rollout heading. I had neglected to retract my hook and was informed by the tower that they saw sparks and told me to check my hook up. I managed to retract the hook prior to reaching the arresting gear. *It was not until some time after I was on the deck that I felt 100% sure that I was in an up-right position! I shut down with 400 lbs of fuel.*

My day had started about 0400. During the day I had flown one hop and briefed another hop as a spare. I had been allowed ample time to sleep prior to the night flight, but was unable to sleep more than about 30 minutes.

Cross-Country

I was on an afternoon familiarization hop in the TC-45J acting as an instructor pilot with two students on their second hop in the Subsonic Navy *Bugsmasher*. I was in the right seat with a student flying from the left and the other student in the rear.

During taxi at home base I took control for about 30 seconds and noticed what I thought was a weak left brake. This was nothing new for a *Beech*, so after making a mental note of the discrepancy for reference during takeoff, landing and taxi, I decided to continue the flight. After runup, the student checked his controls as I looked out, visually checking for proper movement of the surfaces. Everything was A-OK foı takeoff.

After takeoff we proceeded to the boondock for some bounce-and-go practice. It was a scorcher that day with runway temperature at about 100° F and we were heavy with a full fuel load minus the nose tank.

The student's first approach was wide and flat and earned him a waveoff.

His second approach was long, with 2000 feet of runway left at touchdown. We bounced, which is to be expected, and as the student gained control and got the tail wheel down, I raised the flaps to set up the takeoff.

As the student added power, hoisted the tail wheel and began takeoff roll, we began a series of wild swerves on the runway. This is also par for the course, as inexperienced students have a tendency to overcorrect on rudder during takeoff roll.

I took control due to the lack of remaining runway (an estimated 1000 feet). Our airspeed was 50 knots and we were in a swerve to the right. I applied left rudder—nothing happened. Runway shortage helped me decide against aborting.

There we were! The *Bugsmasher* and its gallant crew steaming across the muddy sod on the right side of the runway at 55 to 60 knots about 500 feet short of an ominous-looking batch of trees.

At 65 knots I applied back pressure to the yoke, fully expecting

liftoff and to make like a bird—no such luck.

Increasing airspeed to 75 or 80 knots, well above flying speed, I pulled the nimble craft out of the mud and we were airborne. A sigh of profound relief was heard as we cleared the trees by 25 feet in a skid at about 75 knots. No sweat!

We proceeded back to home base slightly ruffled and landed without further problems.

Maintenance investigation showed the left rudder cable had snapped on the copilot's side, my side. I determined that the rudder cable had snapped sometime while we were taxiing at home field prior to takeoff. Lack of rudder tension led me to believe that my left brake was weak.

I learned a lesson. In the future I plan to investigate further what appears to be minor discrepancies, and especially check *my* controls prior to takeoff.

Ho Hum—Oops!

Who, me? I'm a reservist with 3000 hours—1500 in the *Beechcraft* as an instrument flight instructor. I hold a special instrument rating and am a pilot for a scheduled commercial airline.

Him? Oh, he's another reservist, an FAA pilot with even more experience than I have.

We were on an instrument proficiency flight together. Between the two of us there was a lot of qualified experience at the controls.

We shot six ILS approaches to a field and outbound on the seventh the pilot said, "Watch No. 3 tank. We'll switch out of the procedure turn."

Another touch-and-go landing was made and about 100 feet after

takeoff both engines quit. We had forgotten to switch tanks.

Well, we managed to switch the tanks before we "bought the farm," but what would have happened if the engines had stopped 30 seconds earlier?

Experienced or not, there is no substitute for the good old fashioned check list.

Untimely Chit Chat

I have noticed on several occasions that at some particular air stations, GCA units and towers have a bad habit that sooner or later may result in a serious accident.

As an aircraft reaches minimums on the GCA and is advised to take over visually, these particular tower and GCA units start transmitting a series of relatively unnecessary instructions.

"On the completion of your landing roll contact such-and-such tower on frequency so-and-so UHF or frequency so-and-so VHF for taxi instructions; this is such-and-such GCA standing by for comments . . . blah, blah, blah, ad infinitum."

Let's face it: short final, flare out and touchdown along with the early landing rollout can be very critical moments, particularly under poor weather conditions. Distractions such as trying to listen to and remember frequencies, ... merely adds further confusion and distraction at this time.

If the instructions are important, let's have them on the downwind or base legs, and not bug the pilot when he has his hands full on final.

To further compound problems, I have heard towers utilize the guard channel for taxi instructions, and give radio checks on jointly shared tower-GCA frequencies right at the moment of touchdown.

My recommendation is that any necessary instructions be given prior to final approach and that the instruction to take over visually be followed by a good, long, respectful period of solid golden silence, with emergencies being the sole exception.

Reader Questions Headmouse Answers

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Hard Pack Survival Kit

Dear Headmouse:

Widespread difficulty has been noted in closing the two component parts of the Hard Pack Survival Kit (*Scott Seat Pan*) when the survival equipment listed in NW01-2FDA-2-2.1 HMI for F-4B aircraft is installed. Numerous rearrangements of the equipment within the modified pararaft case have been attempted, but in each case the equipment package was too bulky to facilitate easy closure of the seat pan.

Setting the interlocks, joining the upper and lower sections of the seat pan with the equipment package and raft installed can, at times, only be accomplished by the use of undue pressure applied to the top of the container. At times this has been accomplished by a person standing on the top of the container to compress it, and I know of some personnel using "C" clamps to obtain the same results. By using either of these methods, it is possible to inadvertently actuate the CO_2 cylinder. If this happens while "C" clamps are attached, the top section of the pan ruptures from the pressure of the raft inflating in the enclosed area. It is my contention that extreme pressure should not be required to set the interlocks.

The HMI states that contents of the survival kit may be altered at the discretion of the area commander. BACSEB 32-57 states that contents may be varied at the discretion of the Type and Force Commander to meet special operating conditions. I have been unable to locate any such authorization in this area; yet the equipment is being varied. As an example, it is rapidly becoming standard practice among squadrons of the Pacific fleet to remove the solar still, and replace it with the SEEK-1 kit.

As most of the missions flown by squadron utilizing the *Scott Seat Pan* in this area are over the sea, I think the removal of the solar still is unecessary. In the event that the aircraft is forced down, or the crew ejects while over water, the survivors' primary and most important need is a means of obtaining drinking water. The SEEK-1 kit does *not* provide any means for manufacturing potable water. By experimentation, this activity has determined that by removing the poncho, satisfactory closure of the unit can be obtained without exerting undue pressure on the seat pan. The raft has a weather shield attached, and the removal of the poncho does not constitute the removal of an essential item of equipment. By cutting the weather shield away from the flotation tube of the raft (when and if necessary) it could serve the same purpose as the poncho. If the aircraft is operating in an inland area, however, the removal of the solar still and its replacement with the SEEK-1 kit would seem an excellent arrangement.

PAUL W. CHAMBERLIN, PRCS
NAVAL MISSILE CENTER
POINT MUGU, CALIF

▶ Air Crew System Change No. 12 describes the method of installing the AN/PRC 49 into the RSSK-1 Rigid Seat Survival Kit as utilized in the F-4 aircraft. The change deletes the solar still and poncho, thus allowing ample clearance for closure of the kit. However, contents may be altered at the discretion of the type and force commander any time he deems it necessary. Undue pressure, clamps, . . . should *never* be used to close the kit. Damage to the pressure suit controller, emergency oxygen system and raft would undoubtedly result.

Very resp'y,

Headmouse

Seal and Shear Wire Practice

Dear Headmouse:

Some controversy has come up about shear-wiring T-1A external canopy emergency jettison hand-pulls.

Many are of the opinion that all emergency devices should be seal-wired or shear-wired to indicate if the system has been tampered with or prevent accidental actuation of the device.

Would it be possible or practical for NASC to initiate a publication that would specify what devices should be seal or shear-wired and the type of wire to use?

E. CRISP, PRC
QUALITY CONTROL, AMD
NAS DALLAS

▶ Controversy over the T-1A can be settled by referring to the applicable HMI and IPB. There is

no requirement for shear-wiring the item you mention. In new design aircraft shear wire is *not* used to secure nor is it dependent upon fractures as the basis for operation of emergency devices such as emergency exits, fire extinguishers, ejection seats, emergency cabin releases, emergency bomb releases and similar items.

T. O. 1-1A-8, Aircraft Structural Hardware manual outlines the general practice concerning the use of seal and shear wire. It states, "Copper wire, .020-inch diameter, aluminum wire, .031-inch diameter, or similar size wire called for in specific technical orders should be used as seals on equipment such as first aid kits, portable fire extinguishers, emergency valves or oxygen regulators. *Warning*: Care should be taken not to confuse steel with aluminum wire." Note that items listed in my first paragraph are not included.

Specifications of devices and type wire are covered by T. O. 1-1A-8 and the maintenance manuals for each model aircraft. Cost, research, and compilation of this material and the problem of updating a separate manual continuously for Navywide use precludes its practicality. Perhaps a reference file developed locally covering aircraft models normally serviced by a particular unit might prove both useful and practical.

Very resp'y,

Headmouse

Annual Index

Previously APPROACH has printed an annual index for each fiscal year in its July issue. Due to a shortage of space the yearly index was not included in the July 1964 magazine. Current and future indexes are to be included in *CROSSFEED*, distributed to all aviation safety officers.

Additional copies of the index will be available on request for libraries, manufacturers, and various non-Navy Government, industry and individual civilian and military paid subscribers. For your copy, merely address Commander, NASC, Attn: Safety Education Department, NAS Norfolk, Va. 23511.

"Aeronautics may be an exact science, but flying sure isn't."

LPU-2/P Vest

Dear Headmouse:

Reference the comments concerning flotation equipment for flight deck personnel in "Notes from Your Flight Surgeon," August 1964 APPROACH. We in Heavy Ten and USS CONSTELLATION have conducted a limited evaluation of the USAF LPU-2/P Underarm Life Preserver. The subject first came up at the May 1964 meeting of the ship's Aviation Safety Council. Having remembered seeing this compact and lightweight "Water Wings," I acquired two from Hickam Air Base for the evaluation.

The plane directors, plane captains and maintenance personnel who did use the vest found it to be comfortable. It did not interfere with their work and they vastly and unanimously preferred it to the packaged inflatable life preserver now in use. The LPU-2/P can be inflated with one hand, uses CO_2 cylinders similar to those in the Mk-3C and has about the same buoyancy. It can easily be fitted with a night signal.

The great advantage of the LPU-2/P is that it is *here now*. It costs $19 and has FSN 4220-630-8714. The CO_2 cylinder for it has FSN 4220-347-9500. Admittedly an automatic vest with all the features in the article cited is highly desirable but it may be years away. CONSTELLATION is requesting ComNavAirPac to outfit the ship and Air Wing with the LPU-2/P.

D. R. AYRES, LT, USN
ASO VAH-10

—A

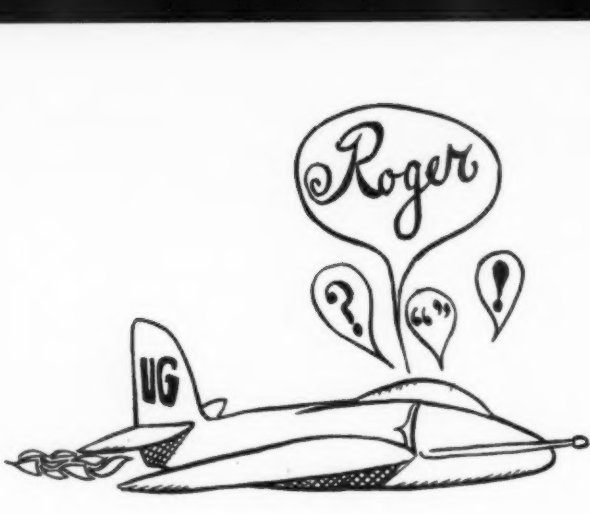
▶ Thank you for your letter. Squadrons on INDEPENDENCE and MIDWAY have also used the LPU vest. (See APPROACH, February, 1964, p. 31.) However, for the latest developments on flight deck flotation gear, see page 35.

Very resp'y,

Headmouse

Vertigo Gimmicks

Headmouse has heard that there are a number of "nickel and dime" methods that pilots, through the years, have discovered to help combat their own personal brands of vertigo. If you have a trick that helps you get things back on an even keel, send it in, Anymouse style. Don't sign unless you want to, but share your idea with other APPROACH readers, please.



30 October

0800 "We have had it, Skipper. If any more pitot tubes break off, our boys will be flying minus a couple of instruments. Trouble is that every dozen or so landings we know that tube sticking out on the end of the wing is going to snap off. Almost makes a man think our birds weren't designed for carrier operations."

"Do the best you can to hold them together, Mac. I want to take all our aircraft with us tomorrow. I'm counting on you to keep them in an UP status."

0900 "Smitty, you're the best maintenance chief I've ever had working for me. I respect your integrity but every now and then we can't go by the book. The boss wants all our birds off this scow tomorrow and we are going to see to it that they get off."

1000 "I been line chief for some time, Smitty, and have seen some shady deals, but this takes the cake. Hiding the gripes on these aircraft is gonna cause somebody some grey hairs."

1445 "That busts it, Skipper. Number 8 lost a pitot tube in the last recovery and the cookie jar is empty. I don't think there is a spare part in the whole blasted system."

"O.K. Mac, thanks for the info, I know you are doing all you can. I'll think out a solution. Right now the Captain wants to see me, I'll worry about the rest of the problems later."

1500 "Best damned outfit I've seen in a long time. Availability has been superb, pilot performance the best in the fleet. One thing you can do for me, I want this carrier to sail with a clear deck tomorrow. Are all your aircraft ready to go?"

"Yes sir, Captain, thank you for the kind words. We have enjoyed the cruise and won't let you down tomorrow when it comes time to leave the ship."

1530 "No problem at all, Skipper. Young Tiger is just the man for the job. He has flown entire missions with nothing but the angle of attack so this will just be a soft ferry flight for him. Any of our pilots could do it but Tiger has the spirit."

"Not too often I argue with my Ops Officer, Tom. I think you have made a good decision. Tell Tiger he is taking number 8 to the beach tomorrow."

31 October

0800 "You BB stackers don't get it, man. Plane captains 'is' boss around here. When I get done cleaning 'this here' plane it's goin' to shine. Pilots get back to base this afternoon and the dollies is goin' to know we're home."

"Raggies think you are so hot. No sense havin' a airplane and the guns don't work."

"Stop jawin', help me with this ladder. Easy now and—$*!%!&. Now you knocked that probe outta line."

"So what, don't look too important to me. You gonna report it?"

"You sure are dumb. That's the angle of attack probe. Naw I ain't gonna report it. Line chief says these planes goin' home no matter what. 'Sides that, it don't look bent too much."

0900 "Tiger you're taking number 8 to the beach. No pitot tube but you shouldn't have any trouble flying it back if you

By Captain Richard C. Hoffman USMC

use a cool head. Might be a little weather at the beach but not too much."

1100 "Boy oh boy, do I feel lousy. Might as well skip lunch, I'm too beat to enjoy it anyway. Shouldn't have stayed up all night but what the hell, a guy can't leave a good 'smoke' game. Not very excited about flying but I'll get back a whole day before the rest of these cats and have all the dollies to myself."

1245 "Red Ball Eight, your vector to home plate is 070.
"Roger, 070, and sayonara you all."

1345 "Red Ball Eight, you'll be cleared for a Tacan approach at 1402. Weather is 800 overcast, 2 miles visibility, with light rain showers. GCA will be button sixteen."
"Red Ball Eight, Roger."

1400 "Almost home, buddy-o. Brilliant Ops Officer we have. Tells me there will be a **little** weather. Ha! He should be flying this pig."

1402 "Red Ball Eight leaving 20,000 at 02."

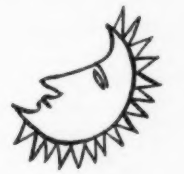
1406 "Red Ball Eight, this is radar. We have you 20 miles out of the field, continue present heading, maintain 2000."

1407 "Red Ball Eight, you are 16 miles south for a straight-in approach to runway 01. Perform landing checklist, flaps as desired."

1408 "God, but it is black down here. Scan seems to be a little slow but no sweat, in a couple minutes I'll be on the deck. Let's see, one unit less than approach speed on the angle of attack and checklist complete except for gear. This pig sure does feel sloppy, couldn't be though, must be my imagination. And down goes the gear handle."

1409 "Tower, this is GCA. We lost Red Ball 8 off our scope and no radio contact."

1800 "Charlie, how come our Smiling Safety Officer ain't smiling?"
"It's 'cause Tiger turned over the outhouse off the end of runway 24. Didn't hurt the bird too much but it sure rattled the native inside. Big Daddy's shook up 'cause Farmer Jones said it'll cost 15 G's to replace it."
"Heck Charlie—at those prices, we're in the wrong business—incidentally, where's old Tiger?"
"Doc Suture took him over to the Quack Shack—Said he wanted to keep him overnight for observation. Mentioned something about Tiger having hallucinations—keeps shouting that people are just no damn good. You know ole Tiger though—always kidding."



Entanglement

Approximately two seconds from touchdown, an F-8A pilot realized that he was going to strike the ramp. With a waveoff attempt initiated too late, the plane sank rapidly, the main landing gear striking the rounddown. The gear separated from the aircraft which continued down the angle deck.

For a fraction of a second the pilot waited to see if he would catch a wire. Feeling no sudden deceleration, he pulled the face curtain. . . . One observer described the ejection as "a rerun of the Martin-Baker training film on a ground level ejection." Here is the pilot's account:

"I reached for the face curtain approximately halfway down the deck. My first grab missed but my second try fired the seat. My legs were extended against the rudder pedals and my back was straight. When I pulled the curtain, I was just about on the no. 3 elevator. The canopy separated and I left the plane. As I tumbled forward, the plane was underneath me. Then I saw blue sky and separated from the seat. As I came around facing forward, the plane hit the water. Tumbled over one more time, hit the water on my back, went under a foot or so and then surfaced.

"The parachute flipped me over on my face and pulled me through the water. My oxygen mask was secure and I was breathing normally. I hadn't yet inflated my Mk-3C. Rolling on my back, I took off my slippery gloves and released the right rocket jet fitting with both hands—it was about a foot above my shoulder. The chute collapsed.

"As I released the left rocket jet fitting, I coasted over the shroudlines and my right arm became tangled. With my left hand I grabbed my shroud cutter which I carry blade-open in a pocket on the front of my torso harness. I easily cut the shroudlines away from my right arm. Then the chute slid under me and my left leg became entangled. As I was cutting it free, my right leg also got tied up. I pulled the toggles on my life preserver and continued trying to cut shroudlines and free myself but without success.

"The seat pack was hindering my efforts so I released both fittings. As the pack bobbed to the surface, it clipped me on the jaw—my only injury.

"I had been breathing fine with my oxygen mask on but decided to take it off at this time. Released the left side but it kept slapping my face so I took off my hard hat. The shroudlines were mainly tangled around my right foot.

"A plane guard helicopter was now approaching with the sling down. The crewman motioned me to

Forgot

Almost immediately after an aircraft went over the side after attempting a landing aboard ship, the rescue helo was overhead. The pilot escaped from the sinking plane. When it became apparent that he was injured and could not help himself, the SAR helo crewman went into the water. Because the pilot had sustained a painful dislocation of the hip, the rescue seat could not be used.

The pilot's torso harness was equipped with the helo lift ring. However, at this ideal point for its use, neither the pilot nor the crewman thought about it. With difficulty, the pilot was strapped to the horsecollar and hoisted into the helicopter.

get away from the chute—of course I could not comply. He came down the cable, knife in hand to help me, He, too, became entangled in the shroudlines and lost his knife.

"I wrapped the helicopter sling under my arms but the cable was wound around my legs along with a few remaining shroudlines. Now I was bobbing in the sling with my feet pulled out of the water. The helo hoist operator signaled us to gather in as much chute as possible and he would haul us up.

"We cradled as much chute as we could in our arms and the crewman gave the hoist operator a thumbs-up. I freed my legs with my right hand just as the helo began to retract the hoist. Parachute, helo crewman and I were all hauled up into the helo in one entanglement. (*The pilot's torso harness helicopter lift ring was not used in this rescue.—Ed.*) The helo crew didn't get the parachute unfouled until they cut it loose from the cable aboard the carrier.

"I felt fine through the whole experience except right before being picked up I began to tire. The one thing that bothered me most was the thought of being dragged down by the parachute with the rescue helicopter so close."

The Pause that may Save your Life and Plane

By LTCOL E. R. Rogal

There are two types of in-flight emergencies. The first requires immediate and positive reaction, while the second normally allows for a detailed analysis and choice of several options. It is this latter class that I am concerned with today.

In this category is the emergency wherein a failure does not affect the aircraft's flying or performance qualities, yet the pilot's concern over it detracts from his flying of the aircraft and a mishap results.

The following examples are typical of this type accident. Keep in mind that in all three, the aircraft were airworthy, and the engines were still delivering thrust.

- F-4 lost airspeed indicator. Confusion between pilot and RIO resulted in both ejecting.
- A-4 had fluctuating oil pressure after takeoff. Pilot turned downwind and landed at 170 to 180 knots with full drop tanks into midfield arresting gear. The wire parted, causing the aircraft to pitch up and become airborne. Pilot ejected while in an "unusual attitude." Aircraft landed and rolled off end of runway.
- A-4 lost nose cone in landing pattern. Pilot landed hot and long and tried to force aircraft to stay on deck. Nose tire blowing caused pilot to eject on runway. Aircraft became airborne and crashed.

These accidents, and many more like them, would not have happened had the pilots correctly analyzed their situations. If they had taken just a moment to see what they had remaining, they would have discovered their aircraft still flying and that there was ample time in each case to decide on the proper action to take. They need not have hurried themselves into an accident by immediately assuming that a serious condition existed.

The word on instrument cross-checking is that no flight or engine performance instrument stands absolutely alone in its indication. Concerning landing: why land hot or fast if the aircraft will safely fly a normal approach? If a fast one is needed, it must be planned and flown with the greatest of care.

The prevention for accidents of this nature is that the correct assessment of an unusual situation must be made. But to do it, time and presence of mind are needed. A way to acquire them can be found in the following:

- Upon the occurrence of an unusual situation, hold what you've got for an instant and look about; nine times out of 10 you'll find things are not as bad as originally thought.

If the above thought was followed by each pilot when things were not quite right, cockpit discipline and presence of mind would come easier. Panic could be averted and plans to get the aircraft on the deck in one piece could be carried out. The aircraft malfunction or failure might then be a yellow sheet down-gripe instead of a contributing factor in an AAR.—*The Hot Dope Sheet*

OPS NOTES

EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Warm-ups, A Must

The wing aviation safety officer spoke of the need for caution in scheduling pilots after long periods without a flight. This situation is a result of restrictions on funds causing a corresponding drop in flight time. These long periods between flights cause a loss of proficiency and set the stage for accidents unless pilots are given fam hops.—*1st MAW*

Ground Radio Checks

Radio checks between the hours of 0900 and 1630 interfere with essential traffic transmissions by tower operators. Along this same subject, avionics personnel often cut in on transmissions with "going down in flames" voice tones.

It is recommended that all routine radio checks be performed prior to 0900 or after 1630 and instruct avionics personnel to properly modulate their voices to avoid that *mayday* sound.—*MAG-26*

Hazardous Deplaning

Passengers from transient aircraft have been observed walking dangerously close to moving propellers and through propellers on engines just shut down. The Board recommended that to help alleviate this situation the transient line always park transient or local transport aircraft with the exit door facing the hangar. This will permit passengers to walk directly to the hangar without walking around or under the aircraft—*NAS, South Weymouth*

Preflight Inspection

The responsibility of pilots to ensure preflight of his aircraft while on extended cross-country training flights was discussed. It was brought to the attention of the meeting that this is a problem at some enroute stations. Reliance on pilot preflight procedures at these stations has resulted in failure to detect minor discrepancies. It was recommended that Aircraft Maintenance issue a daily preflight inspection form to all pilots departing on cross-country flights. It was also recommended that pilots returning from cross-country flights return the completed daily preflight inspection to Aircraft Maintenance. — *NAS Los Alamitos*

Point of View

In the following account, a First Lieutenant aboard a destroyer on plane guard duty describes the attempted rescue of a survivor after an A-4C accident. The "A-4C survivor" turned out to be an SAR helicopter crewman awaiting pickup after his helo had rescued the A-4C pilot and flown back to the carrier.

"I was sitting in the wardroom when the word was passed over the 1-MC to man the rescue detail, a plane had gone down. I checked to see that all rescue equipment was on hand and sent a man to the bosun locker for the wet suit. As everything was rushed, I donned the wet suit myself rather than see who was supposed to be the swimmer. I had had a great deal of lifesaving experience during high school and college.

"The word was passed that the carrier's helicopter had picked up the downed pilot, that the destroyer would pick up a crewmember still in the water, and to make ready to put a swimmer over the side.

"A horse collar with a line to the ship was attached to me. When I jumped into the water, the man was about 50 yards off our beam. I began swimming toward him. At the same time the ship commenced backing down to keep me away from the screws. The next thing I knew the line attached to the horse collar had pulled taut while the ship was backing and I was being dragged through the water. Then, either the life line snapped or someone cut it. I recovered and started swimming toward the crewman. He, in turn, was coming toward me."

An excerpt from the "survivor's" narrative here demonstrates that it's all in your point of view: "I knew the helo would return shortly so I inflated my PK-2 life raft, which is carried in a backpack, and crawled aboard for the wait. While I waited, a destroyer maneuvered about 50 yards alongside. I tried to let them know I was all right. I then noticed that a man was in the water. I could not tell if he was coming to help me or had fallen overboard. I rolled from my raft and swam toward him and called to find out if he was all right. When I reached him, he was OK and we both clung to my raft until the helo returned."

"When I got to the man in the water," the destroyer Lt's narrative continues, "I found him in good condition and apparently more concerned for my welfare than his own. We both hung on to his rubber raft waiting for the ship to maneuver to pick us up. Before the destroyer had time to maneuver, the helo was overhead. The crewman was picked up first. I climbed into his raft which supported me quite well even though filled with water. The helo then picked me up.

"I have a couple of recommendations:

- That destroyers use only very experienced swimmers for rescue. It is rather a shock to jump into the water and then realize you are in the middle of the ocean and not at the beach.
- That all swimmers carry a knife. If the line attached to me had not snapped or been cut, I might not be writing this report."

The reporting flight surgeon had two recommendations on the rescue aspect of this accident:

1) That destroyer plane guard crews be equipped with a suitable webbing cutter for their own protection and to increase their effectiveness as aircrew rescuemen.

2) That destroyer plane guard crews who go into the water be chosen for their swimming ability and be equipped with a compact inflatable life preserver [Mil-L-0015581G (Ships)].

Notes from your Flight Surgeon

Canopy Vice

AT the end of a taxi test, the pilot secured the QF-9G and departed the line. The plane captain then started securing the aircraft for the day. While standing on the steps of the aircraft, he activated the external canopy control handle. As the canopy began to close he noticed the inverter circuit breakers were still in. After releasing the handle, he leaned into the cockpit to reach for them. The canopy continued to close, squeezing him between windscreen and canopy frame.

After blacking out momentarily, the plane captain tried to reach the internal canopy control handle but could not. He called for help. Some 30 seconds after being caught in the "canopy vice," he was freed. He had sustained severe internal injuries.

Haste was a factor in causing the plane captain to violate standard, safe procedure. He states he was hurrying to secure the aircraft before quitting time in order to hear the pilot's post flight comments in the line shack.

The flight surgeon thought fatigue was a possible contributing factor. Even though the plane captain stated he was not tired, he had been on duty 15 hours of the prior 25 and stated he had a restless night.

Five Below

WHEN rescued from the water, the downed pilot was very cold. His rectal temperature was 94.2° F. Since rectal temperature is one degree higher than oral, this indicates his oral temperature was 93.2°, some 5° below normal. His low body temperature was a result of wearing the Mk-5A anti-exposure suit without its liner and with the neck zipper open.

Either, Or

DURING the investigation of this accident (over-loading in excess of the ultimate load factor on top of a previous unreported overstress), it was discovered that the student NAO was not equipped with an anti-G suit as required by NATOPS and OpNavInstr 3710.7B. Yet he was subjected to 6.3 G's without protection. It is recommended that one of two things be accomplished: Either adjust the flight syllabus to limit maneuvers to a maximum of 4.5 to 5.0 G's or equip all students with anti-G suits.

—Flight Surgeon in MOR

No Rafts

FOUR survivors of a helicopter ditching at night were in the water for periods varying from 20 to 34 minutes before being rescued by helicopters. None of the men had taken their life rafts with them as they exited the plane. Later they maintained that they purposely did not have the rafts attached to them because they felt the rafts might impede egress through the escape hatches. However, as the reporting flight surgeon says, if rescue had been delayed, the men could have been in trouble without the rafts.

The flight surgeon recommends consideration be given to redesigning the PR-2 life raft packet. (*At the present time, the Aerospace Crew Equipment Laboratory is working on a new raft design for helicopters.—Ed.*)

Quote Without Comment

FOLLOWING is an excerpt from a message occasioned by the explosion of a liquid nitrogen container used to service systems in F-4 and F-8 aircraft:

"Tube assembly, liquid withdrawal . . . broke off flush with teflon nut where male end of assembly threads into container. First indication of failure was spewing of liquid nitrogen from around threads. Shortly thereafter, tube assembly blew completely out of top of container. *Operator saved from serious injury by protective clothing and face shield.*"

"The Birds Is Coming"

A TS-2A was flying downwind in the touch-and-go pattern when it encountered a large flight of vultures. One bird struck the pilot's windshield. Although the windshield was only partially torn loose, the inner lamination of safety glass shattered and was thrown over the entire cockpit. Both pilots had their helmet visors down at the time, preventing possible serious eye damage.

Headed Off

A STUDENT naval aviator on a scheduled night solo familiarization flight struck a tree shortly after liftoff and crashed.

"The fact that the pilot was tightly strapped in and had his APH-5 on snugly prevented serious injuries," the investigating flight surgeon states. "Severe lacerations and possibly a skull fracture were prevented by the APH-5 taking the blow instead of his bare head."

THE INNER MAN

By Anchard F. Zeller, Ph.D.

The sun was shining brightly on fluffy white clouds. Patches of green showed through some 25,000 feet below. Rays from the sun were picked up by scattered distant rain showers and reflected as rainbows, adding to the beauty of the day. It was a great day for living.

Three minutes out a fighter pilot routinely contacted approach control and requested a tacan penetration. He was instructed to descend to 20,000 feet. He was next asked if he would accept a VFR descent to 5000 feet and was then instructed to descend to that level and await further instructions. Eight minutes later the pilot reported passing through the 5000-foot level, and when queried one minute later confirmed this altitude. This was the last communication received. Two minutes later a witness saw the aircraft strike the ground.

Scratch one aircraft. Scratch one pilot.

An attractive young woman sipped her drink and stared into space. Her preoccupation was such that she failed to notice the chaplain insignia of the stranger who approached her. A few quietly spoken words, dawning realization—the striking truth—a wife had lost a husband, and four children—a father.

An accident, with its aftermath of death, destruction, and human sorrow, is an unfortunate thing. Can some good come from even the most tragic? Yes, if lessons are learned and others prevented from falling into the same trap.

An accident board composed of honest, hard-working specialists could find nothing to pin-point the cause. After thorough and painstaking evaluation, the most likely cause became merely a statement of the obvious—the pilot lost control of his aircraft during approach and crashed. Yes, this was the cause—but why?

True the day was beautiful, but was the pilot in a position to appreciate its beauty? It had been almost a year since he and his wife had separated. During that time a new baby, now four months old, had been born. What conflicts tear at the soul and distress the mind when grave personal decisions are at stake? He knew that his wife would be waiting . . . waiting for a showdown. Would she be drinking? Drinking had been one of the problems which had led to the separation. Would any of the children be with her? What of their future? Are incompatible parents better than no parents at all from the child's standpoint? And then, the problem of religion. Had seemingly minor differences in faith at the time of marriage been aggravated to the point of being a factor in incompatibility? Were such considerations in the pilot's thoughts as he approached the forthcoming meeting?

It cannot be determined that any of these thoughts flitted through the mind of the pilot as he made his routine transmission and prepared for landing. If any did, their effect on an experienced, capable pilot in a routine flight termination can only be surmised. This is an all too familiar story. Only in retrospect can the problems which prey on a man's mind be related by inference to a faulty decision which led to his death.

When a bolt fractures, a line breaks, or a circuit fails, objective tests can often positively determine the difficulty. Once the problem is determined, corrective action can be initiated. Further observation determines the validity of the remedial action. So progress continues. But how does one determine that personal problems cause errors of commission or omission which in turn cause accidents?

It would be much more comforting if such a relationship could not be demonstrated; because, once demonstrated, the uncomfortable necessity of definite corrective action presents itself.

Take another case—a young pilot undergoing transition upgrading training. Takeoff was initiated for a routine two-ship formation flight. Two thousand feet down the runway Mobile Control noted that the afterburner had failed to light. This information was transmitted to the pilot but was not acknowledged. The aircraft crossed the overrun still not airborne with the nose high and the tail dragging. Three times the aircraft bounced into the air and returned to the ground. On the fourth bounce the aircraft disintegrated against a tree and burned.

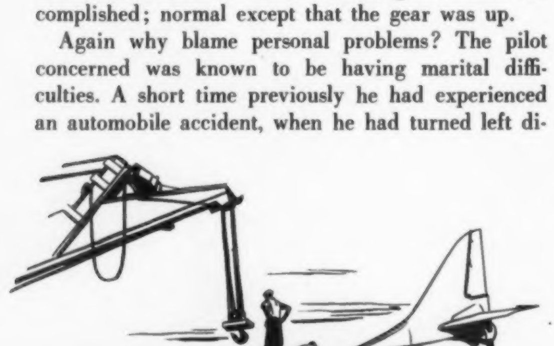
Again a wife was waiting—eight months pregnant

in a strange town in a country where the people spoke a foreign tongue. Again the sorrow for a husband lost and a child who never would know its father.

But how does this relate to personal problems? The pilot was known to be anxious concerning his wife's condition. He had arranged to complete his transition in approximately one-third of the required time. He had not only volunteered but had actively initiated efforts to take every flight possible in order to expedite program progress. Was a calculated chance taken in attempting a takeoff without afterburner in order to avoid losing a flight?

Not all incidents are so dramatic. . . . Here's another. As usual, the pilot could offer no good explanation. On turn to final he had reported the gear down and locked. A normal landing was then accomplished; normal except that the gear was up.

Again why blame personal problems? The pilot concerned was known to be having marital difficulties. A short time previously he had experienced an automobile accident, when he had turned left di-



rectly in front of an oncoming car. Some time prior to the flight which terminated in the gear-up landing, it had been noted that he appeared confused and his speech disorganized. Were personal problems involved? Who can definitely say? Is there a better explanation? Perhaps. It was the pilot's third approach; possibly he recalled putting his gear down previously. Other pilots, however, land successfully following multiple approaches involving repeated lowering of the gear; so personal problems remain suspect.

More examples? Take the case of. . . . No, this approach has contributed about all it can. How about statistics? Solid numbers lend respectability to any thesis. If assiduously used they can sway even the most skeptical.

Good statistical support requires only three things. First, the number of accidents attributable to human error; second, the number of these in which personal problems played a part; and third, in order to put this number into perspective, a determination of how many pilots who have personal problems do not have accidents.

At first glance this is a relatively simple task. Well known numbers appear to apply. To begin with, at least half of all accidents and probably as many as two-thirds are the direct results of human frailty.

Now how about the personal problem aspect? Here the problem becomes a little less clear. There are a number of occurrences where the individual experiencing the accident can be shown to also have had personal problems.

But how about those who fly accident free? Do they also have problems. Of course they do. The problem now arises of determining whether this group has problems as acute or as frequent. Here the statistician polishes off his formulae, oils the machines, and eagerly reaches for numbers to turn into a clear answer. Unfortunately, numbers are not forthcoming, so the mathematician washes his hands of the whole affair. What becomes of the problem? It's still there. Should an attempted answer resort to still more examples? No, because no matter how frequent the examples, and there are many, they will never result in personal conviction unless the individual is emotionally prepared to accept the fact that personal problems can be a factor and act accordingly.

Who can say for sure that a pilot who crashes unaccountably is distracted by marital tensions, financial worries, or philosophic conflicts? Yet each individual who examines his past will almost certainly

attest to the fact that such distractions cause faulty behavior, lapses in attention, carelessness to detail, even recklessness. Now, do these cause accidents? Of course they do. So it is assumed as self evident that personal problems contribute to accidents without specifying to what degree this contribution is involved. Does this acceptance mean that a certain number of accidents are inevitable?

This brings into focus the requirement which it was hoped could be avoided. Namely, what can be done to prevent accidents caused by personal problems?

The first step toward the solution in any problem is the recognition that the problem exists. Once each individual who may be concerned—this is everyone—accepts the fact that his personal problems may interfere with his efficiency, the battle is half won. Even though the problem of preventing accidents may not be solved directly, it may be attacked by indirect action.

There is a fine line between prying into someone else's affairs and showing one's concern. When one's problems become aggravated enough someone may offer help. An observant commander is in an excellent position to do so. The desire to avoid prying, however, makes such action difficult. Good friends are often in the same position. Professionals—flight surgeons and chaplains—often have fewer compunctions about prying but are not usually in as good a position to note behavioral changes.

The result is that most of the time each individual must act as his own counselor. After all, in many instances who else knows? Everyone dislikes admitting weakness. There was a time when it was difficult to persuade some pilots that it was necessary to use oxygen for high altitude flight. The inability to stand the rigors of such flight without the use of oxygen was considered weakness. This was sheer folly. As everyone is adversely affected by oxygen depletion, so everyone is affected by emotional upset. The recognition of this truth will do much to overcome the feelings that failure to operate at peak efficiency in the face of severe emotional problems is a unique individual weakness. It is rather a universal limitation of the human race. The wise self-counselor will consistently seek help when not in optimum condition to cope with his problems. The genuine sympathy, understanding and practical help forthcoming when help is asked for is most gratifying.

Remember, there are seldom any problems as acute as those which follow an accident.

—*Aerospace Safety.*

Flight Deck Life Vest Design

Shipboard operational evaluation of a new flight deck life vest should be underway shortly.

The conferences on flotation gear for flight deck personnel in midsummer revealed little progress in development of satisfactory, general use gear. As a result, Safety Center personnel with current shipboard experience have come up with a vest design which incorporates the basic recommendations previously submitted to the conferences. Initial testing and evaluation have been highly satisfactory.

The vest is ½ body length and is collarless. It has full arm openings and a three-snap front. The design is intended for manufacture in various identifying colors and is sized to be worn over either working chambray shirt or foul weather jacket. It is made of two layers of loosely woven, soil-resistant material which hold a U-shaped, single-cell flotation bladder. The bladder inflates with one 7.9 gram to 8.8 gram CO_2 cartridge or an oral inflation tube.

The vest does not have automatic inflation at this time. However, when such a device is perfected, it should be so constructed as to be readily installed onto the present CO_2 discharge fitting. In the present design, one breath equals 10 lbs. of buoyancy, one breath plus one CO_2 cylinder discharge equals 20 lbs. of buoyancy. Fully inflated, the vest gives 20 to 30 lbs. of buoyancy.

The vest design was turned over to the U. S. Naval Applied Science Laboratory for further test and evaluation. The Safety Center recommended to CNO that a total of 1000 of these vests be manufactured in five colors for shipboard operational evaluation at the earliest possible time. It was further recommended that the evaluation be conducted aboard one carrier in each fleet in order to have a controlled, rapid and effective evaluation.

Detection of CORROSION Damage

by Samuel Goldberg
Materials Division
Bureau of Naval Weapons

Naval aircraft are designed and constructed to withstand the deteriorating effects of the anticipated service environment. However, as performance cannot be compromised, the materials and methods used in aircraft construction are not optimized for corrosion resistance. They are generally acceptable when aircraft receive a reasonable maintenance cycle.

From time to time, circumstances exist that thwart efforts to maintain this balance between performance, environmental compatibility, and corrective action. This review concerns the development of a procedure and equipment to establish the extent of corrosion damage in high-strength aluminum alloy for aircraft stressed skin. The effort was prompted by the disclosure of severe corrosion damage on A-3 aircraft.

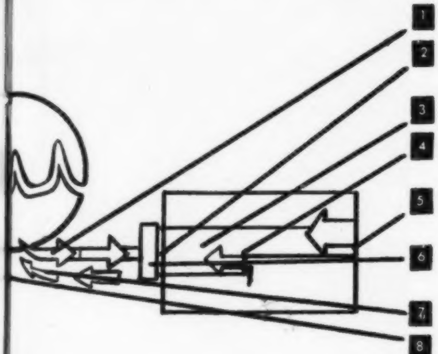
The A-3 airplane was designed and protected in a manner which experience had indicated to be suitable for carrier-based aircraft. An unexpected feature in handling this model is that, because of its size, the airplane must be kept on the flight deck with the tail generally overhanging the deck edge where constant exposure to sea spray and severely corrosive ship stack gases become the general environment. Usual maintenance procedures are affected significantly by the physical limitations and location and size of the airplane and access to maintenance equipment and materials. The corrosion damage is found at the junction between the cadmium-plated countersunk steel fasteners and the 7075-T4 aluminum alloy. The cadmium coating, which provides cathodic protection, is consumed. This leaves bare steel in contact with the aluminum which then corrodes at an accelerated rate. Although the assembly is painted, paint film cracking occurs early in the life of the aircraft. This allows salt water-containing acids and heavy metal ions leached from stack soot and gases – to enter. These substances form an efficient electrolyte and complete the formation of an electrolytic cell. Also, relative movement in the countersink and capillary action work the electrolyte down between the fastener and sheet. These features contribute to subsurface corrosion which is not evident until severe damage occurs. At this advanced state, the paint film is broken and the skin surface raises as a result of expansion of the underlying metal. The corrosion products occupy a larger volume than the metal.

The circumstances outlined contribute to a condition which cannot be determined by existing inspection methods; *radiography*, which usually can detect internal discontinuities, is *ineffective* for this condition.

A study of potential methods for this purpose disclosed that an *ultrasonic* procedure had possibilities. This method was investigated and established to be *acceptable*. Ultrasonic inspection techniques for the determination of internal flaws in materials have received a great deal of attention in the ferrous metal producing industries. The major usage, however, has been confined to heavy

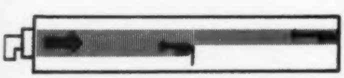
THE PRINCIPLE OF ULTRASONIC INSPECTION

The Sperry Ultrasonic Reflectoscope is an inspection instrument for the nondestructive detection of defects within materials. The Reflectoscope requires access to only one surface, or side, of the material to be inspected. The instrument electronically generates ultrasonic vibrations and sends them in a pulsed beam through the part to be tested. Any discontinuity, as well as the opposite end, will reflect the vibrations back to the instrument, which measures the elapsed time between the initial pulse and the return of all reflections, and indicates such time lapse on a cathode ray tube.



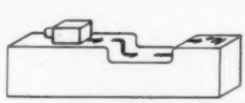
1. Electrical pulse generated in the Reflectoscope.
2. The electrical pulse is transformed into mechanical vibrations by the search unit crystal.
3. The pulse of high frequency vibrations is projected into the material.
4. A portion of the pulse strikes the defect and is reflected back toward the entrant surface and a portion continues through to the opposite boundary.
5. The beam of vibrations is reflected from the back surface toward the entrant surface.
6. The returning pulses reach the crystal where they are transformed back into electrical pulses.
7. The returning energy is amplified electronically by the Reflectoscope.
8. The amplified signals are displayed on the cathode ray tube screen as vertical pips. The pips are spaced along the horizontal sweep line from left to right according to their time of arrival. The spacing is in proportion to the distance between the points in the material they represent.

INSPECTION METHODS

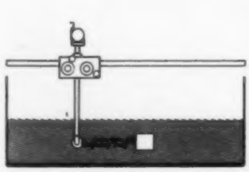


STRAIGHT BEAM SEARCH UNIT. Used to locate defects by projecting a beam perpendicular to the test surface.

ANGLE BEAM SEARCH UNIT. Used to locate defects by introducing a beam of vibrations at an angle to the surface of the test material. Testing sheet and plate are among the applications for the angle beam method.



SURFACE WAVE SEARCH UNIT. Used to project a beam of vibrations which travel along the surface and just below the surface of the material. These vibrations will travel over irregular shaped surfaces.

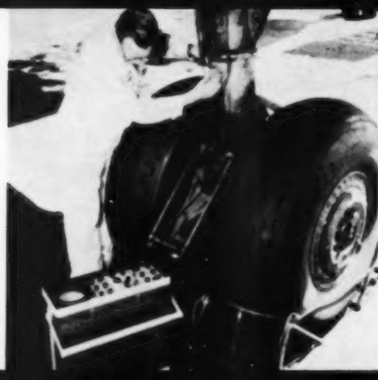


IMMERSION TYPE SEARCH UNIT. Used to inspect materials while immersed in a suitable liquid such as water or oil. This method proves more satisfactory than contact testing for irregular shaped surfaces. Immersion inspection also permits use of a wider range of testing frequencies. Straight beam or angle beam techniques are used by varying the angle of the search unit head in relation to the test surface.

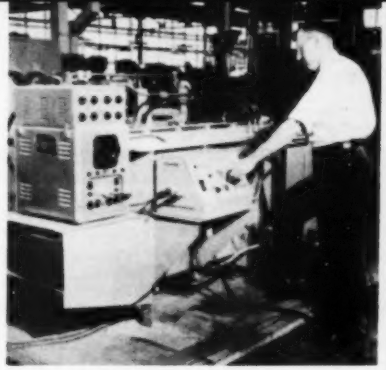
APPLICATIONS

RAW-MATERIAL TESTING. The ultrasonic search for subsurface flaws is conducted long before costly machine time is applied to these ingots. Both producing mills and fabricating shops use ultrasonic Reflectoscope tests as a deciding factor in determining whether they can afford to mark their material OK. It is this ultrasonic OK that justifies the expenditure of time and labor in the design and manufacture of the end product.

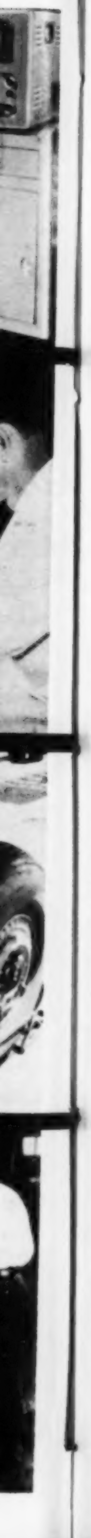
FINISHED PRODUCT TESTING. This completed rotor forging is given its final ultrasonic inspection of the weld area before being subjected to the rigors of jet-speed flight. Production engineers have learned that products designed to meet today's exhausting requirements demand inspection equipment capable of finding trouble before it starts. The Sperry ultrasonic Reflectoscope locates material flaws prior to final assembly thus insuring the quality and safety designed into the finished product.



PREVENTIVE MAINTENANCE. Programmed maintenance, using the portable Reflectoscope for on-the-spot, nondestructive testing of an aircraft landing gear saves dollars in assuring equipment reliability and public satisfaction and confidence. Costly unpredictable failures are prevented. Throughout industry, such programmed inspection can facilitate scheduled parts replacement, or planned obsolescence of components can be accomplished with minimum down time and maximum equipment protection.



IN PRODUCTION. Quality control on the production line, either automated high speed testing or manual piece inspection, can often be accomplished with ultrasonics more conveniently and less expensively than other test methods. Sperry Simac automated inspection systems can register the presence of defects in material at production speeds. Automatic signalling and marking devices indicate the exact location.



sections such as ingots and billets. The adoption of the technique to comparatively thin sections of material is unique to this problem.

The basic element in an ultrasonic device is a transducer for conversion of electrical energy to sound energy, and vice versa. The transducer depends on the unique characteristics of certain materials whereby, within limits both with respect to magnitude and frequency, a dimensional change of the material occurs which responds precisely to frequency and magnitude of the driving magnetic field. The mechanical response to this results in a corresponding interaction with the surrounding environment in the same characteristics as those of sound waves generated in the usual manner, i.e., they can be transmitted through solids, be reflected, reinforce each other, and be absorbed. An ultrasonic inspection device exploits these characteristics.

A number of commercial instruments are available for this type of inspection:

Sperry-Products Reflectoscope, Curtiss-Wright Immerscope, Branson Instruments Sonoray and Vedigage, Fokker Bond Tester.

The Sperry Products Model UN Reflectoscope was determined to have the desired characteristics and was selected on the basis of: (a) availability; (b) design (modular construction); (c) low cost; (d) dependability; (e) compatibility for use with required transducers and available frequency range; and (f) compatibility with the developed inspection techniques and the fact that it could be modified easily for coupling to a recorder.

Several basic techniques were applied and developed. A significant finding was that the corrosion seemed to absorb completely the sound energy, which was unique, since most discontinuities reflect some of the incident sound energy, so that information as to their existence and location can be obtained. This was not the case, however, with the corrosion layers so that additional techniques had to be developed. These techniques located and defined corrosion damage areas which extended beyond the countersunk holes. Absence of signals reflected from the back surface was used to determine where corrosion layers existed. Corrosion could be detected underneath countersunk areas. A triangulation method was developed for measuring the depth of the most extensive corrosion. The final version of the equipment includes the Sperry Products Model UM Reflectoscope with 10.0 mc. ¼-inch-diameter, flat lithium sulfate transducers. The equipment for Overhaul and Repair Station use also includes coupled recording equipment and fixtures for attachment to wing surfaces for rapid inspection.

This equipment and procedure provides, for the first time, a capability to determine the extent of internal corrosion damage in critical aircraft parts. Equipment will be available at an east coast and at a west coast Overhaul and Repair. As experience is gained, additional equipment may be required.

Films

SPACE Technology—Transistor Theory—Leadership—New Weapons Systems—Topics like these and 6000 others are covered by training films now available in the Motion Picture Distribution System. Some 20 to 30 new films are distributed each month and more are on the way. These films are useless if they remain in film libraries—they are effective only if seen—and helpful only if used. Liven up your training program; use your local film library. If they haven't got it they can get it. NavWeps 10-1-772 of August 1963 is the latest supplement to the U.S. Navy Film Catalog NavPers 10000-A and lists all films distributed since July 1957. Many of the films are just as applicable today as when first published.

Here some releases which may interest you.

MN-9616—Aircraft Pressure Fueling. (10-min. color sound)

Motivates fueling crews to use proper pressure fueling techniques, and thus prevents fuel cell rupture. A brief explanation of how the pressure fueling system works is included. Date 1962. Distribution Code A.* Unclassified.

MN-9580-A—P3A Weapons System Operational Techniques—Engine Management. (16.6-min. B&W sound) Date 1963.

*Dist. Code. G—General Distribution. Available through District, FAETU, NARTU, Marine and PIO Libraries.
A—Aviation—FAETU and NARTU
M—Marine Corps Libraries

One hundred forty-two maintenance goofs are going to happen in the fourth quarter of fiscal 64. These goofs are going to cost us around 10 million dollars in aircraft losses and damage to the aircraft.

Maintenance Goofs

This forecast is predicted on the averages of the number of maintenance errors committed during the years 1961, 1962 and 1963 and the number committed so far this year. During the three years 353, 352 and 347 occurred—averaging 351 mishaps per year. The third quarter of '64 recorded 125 maintenance goofs, bringing the total for the first three quarters to 209. If the pattern for previous years is any indication, and if efforts are not redoubled to prevent these mishaps, you and your fellow mechanic will be involved in 142 more maintenance goofs.

Damage losses for the past two years have averaged $18,750,000. Damage losses during the 3rd quarter of 64 amounted to $3,617,960 bringing the total for the year to $9,911,670. If predictions based on the past hold, we stand to lose about $10,000,000 in the 4th quarter. An astronomical figure?—not if first line aircraft are involved—in fact the loss of a couple of A-5s might even surpass these figures.

Let's review the 125 mistakes just made. Knowledge of these may help prevent a mishap that is just about to happen and knock these predictions down and availability up.

The most serious mishaps resulted in strike damage to six aircraft and overhaul damage to four. Foreign objects produced the greatest number of mishaps in a single category. Again, we attempt to list these errors by ratings concerned (not necessarily involved) and by model aircraft. In this way we hope to accommodate the mechanic who's short on reading time. We count on the pro to digest all of them.

A-3 Failure to tie down the aircraft during engine turn-up, 2 aircraft received D damage.

A-5 An attempt to spread the tail with the wing jury struts installed resulted in E damage.

A-5 Failure to install a cotter pin in the nut and bolt of the throttle controls resulted in loss of power and an aborted flight.

A-5 Tail cone blown against the stabilizer—E damage.

A-4 Failure to torque a B-nut caused a fire warning light and the flight to be aborted.

A-4 Failure to drain excess fuel from engine scupper after two wet starts caused engine fire.

A-4 Failure to install tailpipe clamp assembly nuts. On turnup fire and heat damaged the tail section. E damage.

A-4 Scupper damaged while being removed.

A-4 Failure to remove the intake duct cover caused B damage.

A-4 GTC operator left the starter probe support yoke hanging in the wheel well; this jammed the starboard MLG. E damage.

F-3 Improper lock-wiring of the fuel tank jettison switch caused the fuel tank to be inadvertantly jettisoned.

F-4 Failure to properly connect the CSD oil line caused CSD generator failure.

F-4 Loose B-nut on the fuel line caused E damage.

F-4 Failure to properly torque the stator vane nuts caused engine damage.

F-4 Improperly assembled fuel pump caused pilot to make an emergency landing.

F-4 Improper installation of the fuel filter clamp caused the engine to flame out on landing.

F-4 Improperly connected starter hose whipped and struck the flap.

F-8 Failure to fair ailerons before folding the wings caused E damage.

F-8 Failure to purge the engine after a wet start caused damage to the engine on light off.

F-8 Improperly installed fuel pump O-ring caused fuel leak and damage to the engine.

A-1 FOD. A stray nut jammed in the engine oil pump caused engine failure.

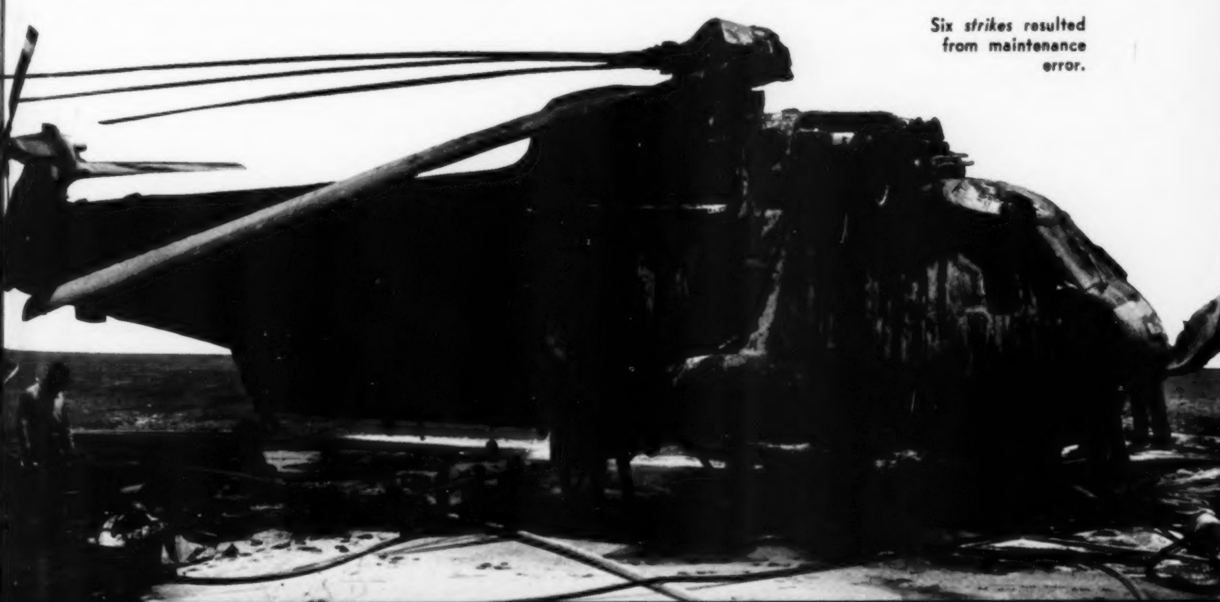
A 1 Improperly lock-wired magneto cannon plug caused rough running engine. Ordnanceman overtorqued fuel tank sway braces on the fuel tank, preventing jettisoning.

B-26 Non-installation of an intake seal caused the engine to backfire; flight aborted.

B-26 Failure to properly torque a fuel line caused flight abort.

P-3 Improper adjustment of the control valve caused the propeller to pitchlock; flight aborted.

P-2 Failure to tighten the preoil plug and improper lock-wiring caused engine oil loss in flight;



Six *strikes* resulted from maintenance error.

engine damage.

P-2 An overtorqued fuel fitting caused an engine fire.

P-2 Failure to tighten five spark plugs caused the engine to backfire and inflight securing of engine.

P-2 Spark plug electrode was left in the cylinder. Caused the engine to fail due to foreign object damage.

P-2 Failure to properly torque an exhaust clamp caused minor damage.

P-2 Improper torque of the oil cooler line B-nut caused inflight securing of engine.

P-2 Failure to properly secure the distributor cap caused inflight securing of engine.

C-54 Improperly torqued push-rod housing caused inflight engine oil leak.

C-121 O-ring packing was cut or pinched causing inflight oil loss; flight aborted.

C-121 Improper lock-wiring of the rocker box interconnector gland nut caused inflight oil leak and securing of engine.

C-121 Cross-threaded oil line fitting allowed oil to leak—engine caught fire, flight was aborted; E damage.

C-121 Failure to properly connect the propeller governor disconnect plug caused flight abort.

C-45 Improper alignment of the governor inlet hose resulted in loss of engine oil and aborted flight.

S-2/C-1A Both engines were turned up without oil.

S-2/C-1A A piece of cowling that had been removed blew into the propeller on turn up causing E damage.

S-2/C-1A A crewman failed to properly secure a power supply unit in the tail section of the aircraft; E damage.

S-2/C-1A Loose B-nut on the heater line caused engine fire on turnup.

S-2/C-1A Foreign object left in the prop governor caused inflight malfunction.

S-2/C-1A Rough engine was caused by leaking intake pipe, No. 1-2-3 cylinder exhaust stacks cracked, loose spark plugs, and idle mixture was out of adjustment.

S-2/C-1A Failure to properly torque the cylinder to engine case caused engine damage.

S-2/C-1A Failure to properly torque the valve lock screw nut caused rough running engine.

S-2/C-1A Improper alignment of push rod adjustment screw resulted in emergency landing.

E-1B Failure to install ground lock pin in the landing gear caused the port MLG to fold during maintenance turn up. C damage.

UH-2 Improperly installed fuel line filter packing caused flameout.

UH-2 Stray lock-wire in the fuel control caused loss of RPM.

UH-2 Contaminated fuel and failure to sample fuel resulted in engine failure. Strike damage.

H-3 Engine platform unlatched—platform opened in flight causing E damage.

H-3 Failure to lock tail rotor caused E damage.

H-34 A gasket installed without punching out the inlet side for the engine oil pump caused engine failure in flight.

H-34 Incorrect installation and alignment of the tail rotor drive shaft quick disconnect coupling caused the pilot to lose control in hover. B damage.

A-4 Incorrect bolt installed in port catapult hook—jammed the MLG. The aircraft landed into the barrier. C damage.

A-4 Failure to install safety pin caused inadvertent jettison of canopy.

A-4 Use of grinding wheel to remove rivets from a fuel cell and failure to comply with safety precautions caused *strike* damage.

A-4 Wing section of aircraft damaged while lowering tail section into place.

A-6 Canopy jettisoned while using improper inspection procedures. E damage.

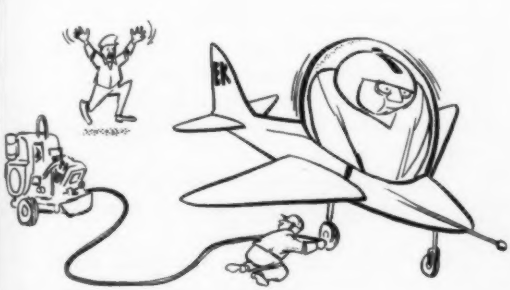
A-4 Improper installation of a hydraulic line jammed the port MLG resulting in a wheels-up landing. D damage.

A-4 Improper procedure was used to drop-check

the landing gear. The jack was hit by the landing gear.
F-1 Overtorque/misalignment of speed brake actuating cycling resulted in E damage.
F-1 NLG strut failed due to overservicing the strut with either air or hydraulic oil. C damage.
F-4 Failed to install cotter pin in the tail hook shoe.
F-8 NLG was retracted without use of jacks. D damage.
F-8 Failure to install the wing jury strut caused D damage.
F-8 Pneumatic system water drain cap was left off the fitting in the NLG well—emergency system failed which caused a NLG-up landing. D damage.
F-8 Failure to install a cotter pin in the wing unlock mechanism resulted in a wing-down landing.
F-8 An attempt to install the canopy safety pin without first checking the position of the firing pin sear caused the canopy to jettison. E damage.
F-11 The axle nut was overtightened causing the wheel to fail.
F-11 Installation of an improper washer allowed the uplock fitting to be overtorqued and fail causing hung port MLG. E damage.
T-2 Canopy manual release handle was returned to the normal position without assuring H fitting rear hooks were engaged; caused canopy loss in flight.

A-1 Cross-threaded nut installed on tail hook snubber caused D damage.
A-1 Aircraft improperly lowered on jacks causing E damage.
C-130F Failure to install the wheel bearing spacer during brake assembly change caused E damage.
P-3 Placing a power unit under the flaps caused damage to the flaps when they were lowered.
P-2 The crew did not ascertain that the tip tank was empty before removal, causing tank to drop to the deck.
S-2/C-1A Locking pins were extended prior to wing spread; no pin checkers were utilized.
S-2/C-1A Attempt to fold the wing with lock pins out of sequence resulted in broken lock fittings.
T-34 Improperly installed MLG retract brace pins caused D damage.
H-34 *Murphy's Law.* Cross-connected servo hydraulic lines on two aircraft caused B damage to one aircraft and D damage to three others.

A-4 Failure to pull a valid no-voltage check. E damage.
A-4 Failure to tighten sway braces. Inadvertent bomb release.
A-4 Failure to disconnect the bomb rack primary lead caused loss of rocket launcher in flight.
A-4 Improperly connected primary lead caused inadvertant jettison of bomb rack.
F-4 Lock washer omitted from the Aero 27-A bomb rack safety switch, caused loss of bomb rack.
F-4 A pylon assembly was not properly locked, causing pylon and fuel tank to fall off aircraft.
F-9 Failure to properly latch bomb rack hooks allowed Aero 4B rack containing stores to be lost in flight.
A-1 Overtorqued sway braces.
A-1 Improperly lock-wired magneto cannon plug caused rough running engine. Ordnance overtorqued fuel tank sway braces on fuel tank preventing jettisoning.
P-2 Failure to ensure the pull rings were taped down on the Mk-6 float lights caused ignition in the stowage rack.



Wonder where

A-4 Improperly connected electrical leads gave false indications on fuel transfer store; fuel ingested by receiver aircraft. Strike damage.
A-3 Improperly installed low level fuel switch caused grounding of electrical lead.
A-3 Improperly installed bleed air line—the flight was aborted.
F-4 Improper installation of the electrical connector caused a fire warning light.
F-8 Failure to correct a discrepancy in the airspeed indicator contributed to a hard landing. D damage.
T-1A Improper installation of the landing gear door cannon plug damaged landing gear doors.
A-1 Improperly installed canopy jettison switch guard caused canopy to jettison.
C-121 Failure to properly torque the prop governor electrical conduit caused flight abort.
A-4 Failure to properly lock the radome caused aborted takeoff.

A-4 FOD—Nut left in the fuel by-pass port of the fuel pump caused an engine failure—*Strike.*
A-4 FOD. Crewman lost his wrist watch and sound attenuator head set and was nearly sucked into jet intake.
A-4 Fuel cap assembly left loose (later found in the engine bay) caused the aileron control to jam in flight.
A-4 Failure to install a MLG safety pin caused E damage.
A-4 Failure to properly install an access panel caused loss in flight.
F-1 Failure to secure instrument panel caused E damage.
F-1 Line crewman closed the canopy on the ejection seat drogue shackle which was left in the up position. This resulted in breaking the canopy glass.
F-4 Fire warning element was jammed in the access door.
F-4 Pinched connector during installation caused a false fire warning light in flight.
F-8 Failure to secure the starboard ammo compartment door.
F-9 The plane captain leaned into the cockpit while the canopy was closing. D injury.
F-11 Failure to check fuel switches prior to pressure fueling caused fuel cell damage.
T-33 Port engine access door fasteners were left unsecured causing the aircraft to become uncontrollable in flight. *Strike.*
P-2 Bomb-bay salvo handle was pulled instead of bomb-bay selector handle, releasing bomb-bay fuel cell.
P-2 A bolt was left in the port MLG wheel well jamming the landing gear cable and pulley assembly; wheels-up landing resulted in C damage.

re left that wrench...

P-2 Oil tank cap improperly secured caused engine fire.

P-2 Adrift gear jammed flight controls.

C-121 Foreign objects in the control pedestal caused flight abort.

C121 FOD—A nut in the control pedestals caused trim tab to jam in UP position.

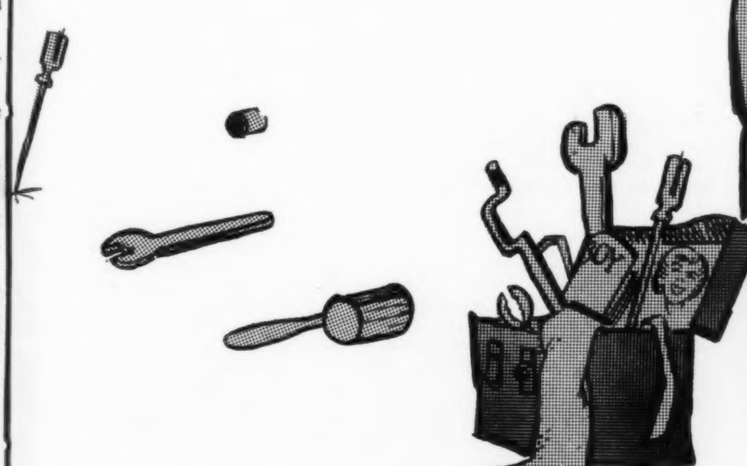
T-28 The plane captain turned up the aircraft without setting the parking brake; the aircraft jumped the chock.

U-16 Placing the landing gear handle UP caused gear collapse and E damage.

H-3 Failure to secure access panel prior to flight allowed panel to damage the main rotor blades.

H-13 Crewman allowed the rotor blades to strike two other helicopters during engine turn-up. E damage to 3 helicopters.

There you have it—the past is a grim picture but there are also some good aspects in it,—all of these mishaps are of a preventable kind. The key to accident prevention in this field is *you,* Mr. Mech '64. Every skipper knows this and therefore depends on you to reduce losses incurred through maintenance errors and thereby increase mission-effectiveness. You must read safety, think safety, plan safety, and then work and play safety. This is *your* responsibility. Got it?



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Letters

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Light holder on left leg . . . easily made from looped webbing.

Flashlight Strap

FPO, San Francisco—Re the discussion on how to attach the two-cell flashlight, our pilots are well satisfied with the following device: two pieces of elastic webbing sewn together to form two loops, the small loop closed by a lift-the-dot fastener, the larger by a buckle. The large loop fits around the leg just above the knee and the smaller holds the flashlight. The photos show the simple construction and easy use.

This arrangement satisfies several needs. First, the flashlight is securely attached in a convenient location. Now that pilots are equipped with the mercury battery survival light, retention of the two-cell is not so important possibly the light would stay in place during ejection or evacuation of the cockpit. What is important is that it is not located to offer a menace during escape. A second benefit is convenience. Once attached, the light is constantly available. Illumination is provided to the instrument panel in general and the flight instruments in particular. The webbing is strong enough to hold the illumination steady during the night cat shot and yet flexible enough to be swiveled and aimed at other areas in the cockpit.

This scheme is not original with our squadron but was suggested by Lt Col D. E. Wegley, USMC. It was adopted by us over a year ago and we haven't been able to improve on the idea to date!

DAVID W. REDFIELD
ASO VMA-242

• VA-172 uses this same type of strap, the only difference being that they use dot fasteners in place of the buckle. Looks good.

Luggage Space

Bethpage, L. I.—Re your article appearing in the March 1964 issue, "The Eternal Question." Being intimately acquainted with the F-111B (TFX), I'd like to take you up on your bet. When the details of the aircraft are revealed, I believe you'll be pleasantly surprised at the amount of space available for stowage of personnel gear and various other equipment carried during cross-country flights. Please forward the parachute bag to the undersigned.

V. DEVINO
F-111 CREW & EQUIPMENT INTEGRATION GROUP
GRUMMAN AIRCRAFT ENGINEERING CORPORATION

• Thanks a million for your letter, Mr. Devino. Our duty scrounger is working with the Riggermouse for a Navy parachute bag for you.

The Paper Mill

El Toro—As a last shot before retirement from the AME/PR field after 22 years of service, I would like to express some ideas which have steadily accrued over recent years.

I have spent the last three years in a futile attempt to collect and combine the total current directives that cover the various items of survival, keep them current and ultimately compile a run-down to pass on to my successor for a guide/check for Administration and Material Inspection as well as for spot checks for quality control. This compendium was to include the systems and pilot's equipment for 12 aircraft.

My conclusion is: *The present directive system intended to cover maintenance and upkeep of pilot/crewmember personal survival equipment, airborne environmental and escape systems is ambiguous and redundant to a point of confusion.*

For instance, in ejection seat maintenance we have Manuals, BACSEBs, Interim Support Equipment Bulletins, Interim Aircrew Systems Bulletins, MRC/HIR/HMI, maintenance instruc-

tions, Fleet Ready Rep Notices and local command directives. Human frailty and error are compounded by the paper technicians. How about giving the mech one source of authority that exists as a primary supplement to the MRC/HIR?

The maintenance organization can get on with a safe flight schedule if you can put one piece of paper in the greasy hand that holds the wrench. His job is not to research, file and monitor the product of a conglomerated mass of staff desks. The ground rules for any maintenance endeavor must be the essence of brevity if you want a tight ship. Who are we writing ground rules for if not for the mech? This suggestion is not a search for an ideal situation but rather pointing up what is obvious to shop personnel. Let's give the inducted high school student and professional military mechanic a simple, single authoritative directive system.

MGYSGT MOUSE

• Many of your comments on the "paper mill" are well taken. The Naval Aviation Safety Center is at this time conducting a study aimed toward supporting specific recommendations to improve the technical directives system not only in the area of safety and survival equipment but in areas covering equipments/hardware as well. Your constructive comments are appreciated.

FSN for Self-Locking Castellated Nuts

West Bend, Wisc.—We are unable to locate Federal Stock Numbers for the new self-locking castellated nuts mentioned on page 43 of the July '64 issue. Please list same. Also request the FSN for Navy flight gloves.

K. H. PETERSON, MAJ
ARMY AVIATION MAINTENANCE
ARMY NATIONAL GUARD

Self-Locking Nuts

**MS-17825-4 thread 1/4-28 UNF3B
FSN KZ531096118390
MS-17825-6 thread 3/8-24
FSN KZ53109618391
MS-17825-7 thread 7/16-20
FSN KZ53109618392
MS-17826-5 thread 5/16-24
FSN KZ53109618393
MS-17826-6 thread 3/8-24
FSN KZ53109618394
MS-17826-7 thread 7/16-20
FSN KZ53109618395
MS-17826-8 thread 1/2-20
FSN KZ53109618396
Unit price: 10¢**

Navy Flight Gloves

**Size 6 1/2
FSN-D8415-579-2857
Size 7 FSN-D8415-579-2858
Size 7 1/2
FSN-D8415-579-2853
Size 8 FSN-D8415-579-2859
Size 9 FSN-D8415-579-2855
Size 10 FSN-D8415-579-2854
Size 11 FSN-D8415-579-2856
Unit price: $3.15 pr.**

Dentist's Drill Useful

NAS Brunswick—Use of a dentist's drill to stop-drill cracks in J-34 engine diffusers has helped the power plants division here save $4000 in parts and 70 man-hours per engine. Authority for stop-drilling diffuser cracks is contained in Overhaul Instructions AN02B-110BC-3 and AN02BA-3 for J-34 engines.

In three months time the drill has saved us about $28,000 worth of diffusers and nearly 500 man-hours. Comparing the $176 cost of the drill and the savings achieved this expenditure is considered to be well worth while.

In addition, this tiny high speed drill can also be put to a host of other uses such as drilling out broken studs, combustion chambers, . . . where the use of a regular size drillmotor can't be used.

R. E. ERICSON, LT

Sonobuoy Beacons in SAR

FPO, San Francisco—Each year many aircraft are lost at sea. This, in itself, is a large loss of money to the various services and to the private organizations which are involved in overseas flying. A great expenditure of time and money has gone into making these flights safer and there has been a marked reduction in this type of loss. However, once an aircraft is lost SAR techniques are utilized that have been in effect for years.

If there are survivors, location of the downed plane may be relatively easy if the survival equipment is properly utilized. In these circumstances the planes and time involved are held to a minimum. The expensive SARs involving many airplanes for several days are the ones in which there are no survivors, but it is essential to search large areas to be sure. (Example: The loss of the Flying Tigers' C-121 in 1962 between Guam and Clark AFB Philippines, with over 100 souls aboard.)

It is proposed that a modified sonobuoy beacon such as the SSQ-23 be utilized to quickly locate the site of the ditching so that the search can then be limited to a few surface craft and airplanes. The money saved in one SAR would cover the cost of installment.

(*Because of lack of space,* APPROACH *has deleted drawings as well as technical information here which the writer states was obtained with the help of LT W. O. Coons.—Ed.*)

As mentioned previously, the weakness of all present systems is that they depend upon the presence of a functioning survivor. It is recommended that a modified sonobuoy be attached to the fuselage of all multiple engine aircraft and to all single engine aircraft if it will not interfere with their mission.

The method of attachment should be such that upon the aircraft striking the water the buoy would detach itself immediately whether the plane floats or not. For this purpose it is proposed that end plates, which would break under a stress force of perhaps 2 G's be mounted just forward of the horizontal stabilizer.

PAUL L. STEBBINS
LT, MC,
FAIRECONRON ONE
—A

• At the present time there is no all weather, dependable aircraft crash locator device available to the fleet. Your proposal is realistic and has been forwarded to BuWeps with the Safety Center's recommendation that the concept be fully explored as a reliable aircraft crash locator beacon.

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Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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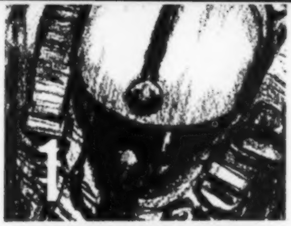

NavWeps 00-75-510

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VF-151	**VF-101**	**HS-2**
VF-33	**VP-31**	**HS-813**
VF-672	**CVW-6**	**HMM-364**
VMF(AW)-451	**CVSG-56**	**HMM-772**
VMF-611	**VP-45**	**H&MS-15**
VA-66	**VP-811**	**VT-24**
VMA-211	**VS-24**	**VT-27**
VMA-322	**VS-663**	**VT-7**
VA-65	**VR-21**	**VT-3**
VA-771	**VR-741**	**VFP-63**
VAH-13	**VMR-234**	**VMO-1**

NAS MEMPHIS

FLATLEY AWARDS

CVA	**CVS**	**LPH**
USS FRANKLIN D. ROOSEVELT	**USS INTREPID**	**USS IWO JIMA**

COMING NEXT MONTH . . . an honor roll listing of many, many other deserving squadrons. These units, although not CNO Safety Award Winners, did complete a year of debit-free operations in competition for the award!

Lift with your LEGS and *NOT* with your BACK.